

BWF Dedicates New Headquarters Building

"We are gathered together to dedicate this wonderful new building and to celebrate the advances of medical science."

Thus, Enriqueta C. Bond, Ph.D., president of the Burroughs Wellcome Fund, opened the ceremony ushering the Fund into a new chapter in our history.

In celebration of 45 years of grantmaking, the staff, board members, and friends of the Fund gathered on Thursday morning, May 25, 2000, to dedicate BWF's permanent headquarters building in Research Triangle Park, N.C., with a short program and buffet luncheon.

In her remarks, Dr. Bond said the new building, with its 43,000 square feet of offices and meeting spaces, will help BWF carry out our mission of advancing the medical sciences by giving the scientific community a neutral site to convene.

Shortly thereafter, the building's convening function was put to the test as a powerful, rapidly moving thunderstorm forced a short intermission in the festivities,

which were held outdoors under tents. BWF staff escorted the more than 200 invited guests into the building, where they took impromptu tours and mingled to wait out the storm.

Once guests were reassembled, two special grant initiatives were announced to commemorate the occasion:

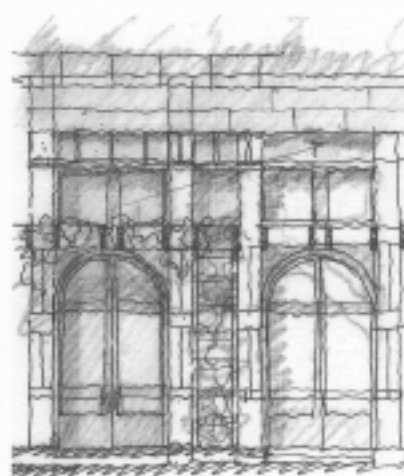
- Grants totaling \$3 million were made to 11 scientists and research teams nationwide who are working in the new science of functional genomics.
- A \$1 million grant was made to the Grassroots Science Museums Collaborative, a group of 15 North Carolina science museums, aquariums, and zoos working together to coordinate science projects and activities for children, teachers, and families throughout the state.

The two new grant initiatives signify the sort of growth and expansion BWF hopes to achieve in its new building. David Kipnis, M.D., chair of BWF's Board of Directors and a professor at Washington University School of Medicine, said the building will provide the Fund with the opportunity to expand its activities with respect to its two major functions: attracting and nurturing beginning scientists entering the areas of biological, biomedical, and life sciences; and supporting underfunded or undervalued scientific areas.

N.C. Governor Jim Hunt was unable to make a scheduled appearance at the dedication, and instead sent a letter of congratulations that Dr. Bond read from the podium. In his letter, Gov. Hunt praised the scientific advances that BWF has helped make possible. The governor especially commended the Fund on its contributions to science education in North Carolina.

"The Burroughs Wellcome Fund's leadership provides an excellent model

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Dedication May 2000

for others by helping to make our North Carolina schools first in America by 2010," Gov. Hunt said. "Your commitment to the advancement of the medical sciences by supporting research and other scientific and educational activities makes the Burroughs Wellcome Fund an important asset to North Carolina, the nation, and Canada."

The educational support Gov. Hunt referred to is the Student Science Enrichment Program. The program provides middle school and high school students in North Carolina the opportunity to have a "hands-on" learning experience in science by awarding nonprofit organizations (such as universities, schools, museums, and community groups) grants to launch projects that enable creative and active learning in science. The governor said he believed this program would lead to increased performance among middle school and high school students—something he said was a critical need for both the state and the country.

Special BWF Building Dedication Issue

Also in this issue:

New Career Awards in
the Biomedical Sciences

New Awards in Emerging
Infectious Diseases

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www.bwfund.org

BWF Awards \$3 Million to Translate Gene Data to Advance Human Health

Deciphering the entire human genome, a quest whose important first step was just completed, will open the way to a new generation of approaches to preventing and treating disease and disability. Having these new genetic “road maps” available will enable scientists to ask new questions about the origin and treatment of disease. To usher in the new era of genomics, BWF is providing \$3 million in grants to 11 scientists or research teams for innovative projects that either use computers to analyze genetic information or use animal models to link genomic information to physical or behavioral traits.

These Innovation Awards in Functional Genomics each will provide between \$200,000 and \$400,000 as a jump start for projects designed to use genomic data to advance human health. BWF officially announced the awards during our building dedication ceremonies.

Among the funded projects are:

- Analysis of the DNA of purebred dogs that are particularly susceptible to

cancer. Elaine Ostrander, Ph.D., and Leonid Kruglyak, Ph.D., of the Fred Hutchinson Cancer Research Center, University of Washington, will trace cancer genes in populations of dogs that get cancer spontaneously, as do humans. Their plan is to identify cancer genes that then can be targeted for treatment, both in dogs and people.

- A computer model that will help scientists mathematically group genes into clusters based on when and where they are turned “on” or “off.” The method is being developed by Terence Hwa, Ph.D., a physicist at the University of California-San Diego. The project borrows from statistical physics to help solve a pressing problem of categorizing genes based on their level of activity.

- A study of the ritualized social activities of bees to associate individual genes with particular behaviors. Gene E. Robinson, Ph.D., an entomologist at the University of Illinois at Urbana-Champaign, hopes the project will link genes with aspects of complex social behavior, then extend this knowledge

to better understand human behavior and dysfunctions, such as social phobias.

The full list of award recipients, along with their project titles, follows:

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

R. Mark Henkelman, Ph.D.

Eugene Fiume, Ph.D.

University of Toronto Faculty of Medicine
Automated image analysis of genetically modified mice

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

University of California-San Diego
Gene expression profiles based on statistical significance of clustering analysis

Genomics (Continued on page 3)

Hands-on Science Takes Off

Kids who may not have ever seen a real-life scientist or even imagined what it is like to do an experiment may now get those chances through a new initiative of North Carolina museums.

The Grassroots Science Museums Collaborative, a group of 15 science museums, aquariums, and zoos, received \$1 million from BWF to develop programs to bring science projects to children in underserved areas of North Carolina. The group will expand locally developed educational programs throughout the state through traveling exhibits and dissemination of teaching tools and lessons.

BWF officially announced the grant during our building dedication ceremonies.

“The grant from Burroughs Wellcome Fund will allow us to develop and coordinate science-based experiences we can offer to families and schools,” said Beverly Sanford, Ph.D., president of the collaborative and executive director of SciWorks, a science museum in Winston-Salem, N.C.

In addition, the program will build closer connections with the state’s educational community and extend school-centered science education into the science museums.

The collaborative will be headquartered at the N.C. Museum of Natural Sciences, in Raleigh.

“As a philanthropy that seeks to advance medical science, we want to ensure that children throughout our home state have

access to science-based avenues of exploration,” said Enriqueta Bond, Ph.D., president of BWF. “It is our hope that this grant will help identify and nurture the next generation of scientists and health professionals.”

The grant is an extension of BWF’s Student Science Enrichment Program, which annually provides more than \$1 million in grants to groups within North Carolina that provide hands-on science activities to middle school and high school students. Begun in 1996, the program has reached more than 23,000 students with activities designed to spark their interest in science.

For more information about the Grassroots Science Museums Collaborative, contact Dr. Sanford at (336) 767-6730.



Dr. Beverly Sanford

Genomics (Continued from page 2)**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**Sudhir Kumar, Ph.D.**

Arizona State University

Computational genomic analysis to identify
and dissect functionally important mutations
in protein sequences**Elaine A. Ostrander, Ph.D.****Leonid Kruglyak, Ph.D.**

University of Washington

Fred Hutchinson Cancer Research Center

Mapping cancer susceptibility genes
in dogs by linkage disequilibrium**Gene E. Robinson, Ph.D.**

University of Illinois at Urbana-Champaign

Sociogenomics: functional genomic
analyses of social behavior with microarrays**Phillip A. Sharp, Ph.D.****Christopher B. Burge, Ph.D.**

Massachusetts Institute of Technology

Whole genome approaches to pre-mRNA
splicing specificity and regulation**Eric D. Siggia, Ph.D.****Frederick R. Cross, Ph.D.**

Rockefeller University

Computational and experimental analysis
of promoters in the genome of budding
yeast**Oliver Smithies, D.Phil.**

University of North Carolina-Chapel Hill

School of Medicine

Computer simulation and animal modeling
of complex genetic systems**Alan R. Templeton, Ph.D.**

Washington University

Cladistic analyses of epistasis among
candidate genes influencing common disease**Science: Successes and Challenges**

Bruce Alberts, Ph.D., president of the National Academy of Sciences, presented the keynote address at BWF's building dedication. Excerpts of his address follow:

We are here to celebrate science and the Burroughs Wellcome Fund's many contributions—both past and, of course, future contributions—to science.

I write a textbook on cell biology, with a bunch of other authors. I've been doing this since 1978. We're now on our fifth book. It's just staggering to look back in this brief time and realize what's been discovered about biology and how cells work. Even us scientists have been amazed at what's happened. So all this is good news.

But there are also major threats to our success. These challenges are being addressed by the Burroughs Wellcome Fund...

One challenge comes from the need to constantly stir the pot with regard to keeping science alive. ...As science acquires more and more knowledge, there is a grave danger in its increasing specialization. ...Moreover, there is a natural feedback loop in our scientific establishment. Students look at their mentors to see what kind of science is valued, go out and form their own research groups, and then do more of the same kind of research. If you take my field, which is biology, and look at the total space of what's interesting and important to study, I would guess maybe 20 percent is being studied. So science constantly needs two kinds of guidance.

The first type of guidance is a real stimulus for innovation. We need mixers for young scientists, which the Burroughs Wellcome Fund is providing.

The second kind of guidance is direction...what kind of science do we value? We need a kind of science that addresses human needs. I don't have to tell you that the world has tremendous needs. Something like 130 million children are malnourished, and Americans generally don't see that. American scientists are



Dr. Bruce Alberts

generally not involved. The Burroughs Wellcome Fund is earnestly engaged—along with its partner in England, the Wellcome Trust—in bringing the best of U.S. and U.K. science to the developing world.

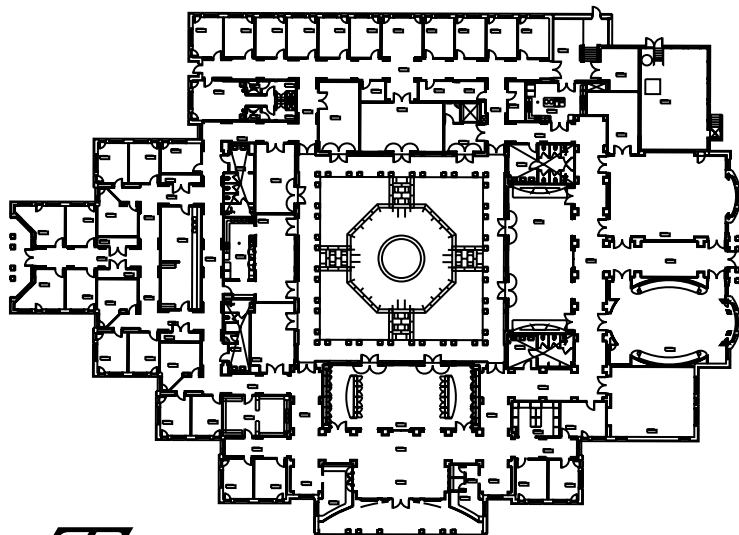
Another challenge in the coming years is to become much more international, to do much more in this age of the Internet to connect to our fellow scientists and help build capacity around the world.

Another science we need to value more is...the 'science of education.' I don't have to tell the people in this room that we need as a nation and a world to take education much more seriously. That means actually studying what works and what doesn't work, and creating a constantly improving system, as we've done in other areas.

I have a dream that somehow the World Wide Web and the ability of colleges and universities to take their best teachers and spread what they are doing through distance learning could create teachers who are as famous on campus as the researchers and...create the kind of dynamic for teaching that we have for science.

I am very pleased that the Burroughs Wellcome Fund Board of Directors voted to ramp up your efforts in this area of education in North Carolina. I look forward to a great partnership in the years ahead.

On the Occasion of BWF's Building Dedication



The Burroughs Wellcome Fund was started on

May 25, 1955, as the corporate foundation of the Burroughs Wellcome company, so we are now celebrating our 45th birthday.

Our mission is to advance the medical sciences through the support of research, education, and other scholarly activities. We carry out this mission by developing human capital for the research enterprise in the United States and Canada. The two strategies we use are to invest in the career development of young scientists and to invest in underfunded or undervalued areas of science by drawing in new investigators to conduct research in these areas.

The purpose of this dedication is to celebrate the Burroughs Wellcome Fund's support of science by telling the larger community who we are, what we do, and how this new building will foster our ability to carry out our mission. We expect that the building not only will demonstrate our "coming of age" and our independence from the company whose legacy we are proud to carry, but also will provide a beautiful space for hosting meetings of our Board of Directors, our advisory committees, and, most importantly, our awardees. We expect that this space also will enable us to hold many scientific meetings that can advance the cause of medical research, as well as enable us to use the powerful ability of foundations to be the "neutral conveners" on a variety of issues, from science to science-education policy.

Daniel Hudson Burnam, an architect, said: "Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing insistency."

—Excerpts from a welcome address by Enriqueta C. Bond, Ph.D., president of the Burroughs Wellcome Fund.



From Design to Dedication



Dedication *(Continued from page 1)*

Stephen Corman, a member of BWF's Board of Directors and chair of our investment committee, added to the Fund's educational patronage by announcing the new \$1 million grant to the N.C. Grassroots Science Museums Collaborative. "We hope our grant will further leverage significant private and governmental funds to produce a continuous series of student, teacher, and family programs throughout North Carolina science museums and informal science education centers," he said.

Beverly Sanford, Ph.D., president of the collaborative, received the education grant for the group. "Our mission is to improve public understanding of science and technology," Dr. Sanford said. Such a mission, she said, is important to help fill the workforce needs of a growing technological and research-based economy in North Carolina.

"Your vote of confidence has inspired us all, and we will work very hard to make sure the impact that our institutions make will be significant," she said.

Bruce Alberts, Ph.D., president of the National Academy of Sciences, spoke about the Fund's support for science and researchers. He said the future of science was dependent on the guidance of foundations such as the Burroughs Wellcome Fund.

"This foundation, although it's relatively new, has quickly become a national treasure," he said. BWF has accomplished this by encouraging new discoveries, by serving as a neutral convening point for scientists to share their work with one another, and by working to inform the public of the value science brings to society, Dr. Alberts said.

"The new building is a symbol of the wisdom of the programs that have been developed at the Burroughs Wellcome Fund," he said.

Dedication *(Continued on page 6)*

Dedication (Continued from page 5)

James Roberson, president and chief executive officer of the Research Triangle Foundation, the private, not-for-profit institution that owns Research Triangle Park, said the addition of the Fund's building to RTP is a symbol of its growth and success.

On behalf of the foundation, Roberson welcomed the Fund to RTP. "I want to say how proud we are that the Burroughs Wellcome Fund has found this wonderful new home in the Park," he said. "The Fund is going to be an important part not only of the science that goes on in this science park, but of the science that goes on across this nation."

As a welcoming gift, Mr. Roberson presented Dr. Bond with North Carolina pottery to be displayed in the new building.

Gail Cassell, Ph.D., vice president of infectious diseases research at Eli Lilly and Company and a BWF board member, announced the new grants in functional genomics and discussed the BWF program in this area. The grants program was established to commemorate BWF's 45th anniversary—the Fund was started in 1955—and it will target two areas in functional genomics, Dr. Cassell said.

The first area focuses on the development of animal models needed to

separate and identify the complex genetic traits—especially those related to human disease.

The second area focuses on computational development. The goal of computational development is to produce mathematical models that will help scientists to analyze data and predict disease-related risks, Dr. Cassell said. That will help scientists to more effectively deduce which people are at risk for certain diseases and how severe the diseases will be, she added.

"You can rest assured that these...awards will give us great return on the investment," Dr. Cassell said.

At the end of the dedication, George Miller, M.D., a BWF board member and professor at Yale University

School of Medicine, perhaps best summed up the event: "Thank you for a wonderful—literally, nothing like a tornado to instill a sense of wonder—stimulating, delicious, and elegant event," he remarked.

— This story was prepared by
Megan Butler and Karyn Hede



BWF leaders (left to right) Enriqueeta Bond, president; Iris Evans, past executive director; and Martha Peck, past vice president of programs and communications.



Guests from the Wellcome Trust included (left to right) Robert Howells, director of science programmes; Richard Lane, head of international programmes; and Sir Roger Gibbs, past chair of the Board of Governors, who helped bring about the Wellcome Trust's gift to the Fund that enabled BWF to become an independent private foundation.



Left to right: Fred Coe, former president of Burroughs Wellcome Co. and former BWF board member; Martha Peck, past BWF vice president of programs and communications; and Philip Tracy, past president and chief executive officer of Burroughs Wellcome Co. and former BWF board member.



Left to right: Trevor Jones, former director of research and development at the Wellcome Foundation Ltd.; BWF President Enriqueeta Bond; and Howard Schaeffer, past BWF board president, who was instrumental in arranging the Wellcome Trust's gift to the Fund.

BWF Board of Directors

Front row, left to right: Gail H. Cassell, Mary-Lou Pardue, Mary Ellen Avery, and Enriqueta C. Bond.

Back row, left to right: David M. Kipnis (Chair), I. George Miller, Jean D. Wilson, Henry G. Friesen, Joseph S. Pagano, and Stephen D. Corman.

Not pictured: Jerry L. Whitten.



BWF Staff

Front row, left to right: Barbara Evans, Carr Agyapong, Melanie Scott, Debra Jinwright, Karyn Hede, Enriqueta Bond, Jennifer Williams, Betsy Stewart, Megan Butler (summer intern), Israel Ehrisman, Debra Linkous, Scott Schoedler, and Victoria McGovern.

Back row, left to right: Brent Epps, Kenneth Browndorf, Jean Kramarik, Kevin Rhew, Martie Gregory, Glenda Oxendine, Sam Carabello, Rolly Simpson, Martin Ionescu-Pioggia, Catherine Voron, Martha Peck (left BWF in June to attend medical school), Judy McConnell, and Nancy Sung.



About the Burroughs Wellcome Fund

The Burroughs Wellcome Fund has an endowment of approximately \$700 million. We award approximately \$35 million in grants annually in the United States and Canada. Since BWF's founding in 1955, we have made more than \$180 million in grants.

BWF's financial support is channeled primarily through competitive peer-reviewed award programs, which encompass six major categories—career development of scientists, emerging infectious diseases, therapeutic sciences, reproductive science, interfaces in science, and science education. We make 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.

BWF 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 Burroughs died in 1895, Wellcome directed the growth of the company into an international network with subsidiaries in numerous countries on several continents. As the business grew, 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 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 no direct ties to the founding company. (Nor is BWF affiliated in any way with Glaxo Wellcome Inc., which emerged in 1995 when that firm acquired all of the Wellcome commercial holdings.) 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 directed 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.

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NEW ON BWF'S WEB SITE:

- 2001 award series brochures in .pdf format for viewing and downloading.
- Interactive application cover sheets that can be filled out on-line and printed for submission.
- Two new special reports: *Investing in the Future of Science: The First Five Years of the Career Awards Program* and *The Role of the Private Sector in Training the Next Generation of Biomedical Scientists*.
- BWF annual reports, previous newsletters, and much more!

\$12.5 Million Awarded for Career Development in the Biomedical Sciences

They are studying special sleep rhythms in the brain that may be involved in memory, probing the action of a particular gene that appears to play a role in triggering a common childhood cancer called neuroblastoma, and applying a newly emerging "microfabrication" technology to help understand how the dynamic organization of proteins in a cell's membrane controls communication between cells, among other research projects.

Working across a range of disciplines, 25 U.S. and Canadian biomedical scientists early in their careers soon will begin using new Burroughs Wellcome Fund awards to conduct research projects that share a common goal—discovery of basic knowledge that will underpin broader efforts to improve human health and well-being.

The researchers are the most recent recipients of Career Awards in the Biomedical Sciences, made during BWF's 2000 award series. BWF has awarded a total of \$12.5 million to foster the development and productivity of these promising researchers and help them make the critical transition to becoming independent investigators.

Career awards provide support ranging from \$445,000 for four years to \$574,000 for six years to bridge advanced postdoctoral training and the first three years of faculty service. During the postdoctoral period, award recipients may train at degree-granting institutions in the United States, Canada, or the United Kingdom. All faculty positions must be taken at U.S. or Canadian degree-granting institutions.

"Unlike most programs offered by government and other private organizations, which typically provide a year or two of postdoctoral training or beginning faculty support, these longer-lasting awards are expected to provide the freedom and funding security that will enable investigators to develop innovative and independent research programs during a critical time in their careers," says BWF President Enriqueta C. Bond, Ph.D. "It is expected that by the end of their award, recipients will be engaged in productive research programs and will be able to compete effectively for support from government and other extramural sources."

The career awards are made in honor of two pioneering scientists who played major roles in the Fund's history—Gertrude B. Elion (1918-1999) and George H. Hitchings (1905-1998). 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.

BWF has produced a new report—*Investing in the Future of Science: The First Five Years of the Career Awards Program*—that describes the program's goals, highlights some of the research projects under way, and reviews some of the career-development issues that researchers often face during the early years of their careers. (See article on page 11.) Contact BWF to obtain copies of this report.

BWF began the career awards program in 1995, and we have made a total of 126 awards—an investment of approximately \$63 million in the careers of biomedical investigators. Eight of the awards, including two this year, have gone to investigators in reproductive science, which BWF considers to be seriously understudied and therefore a special target for support.

"Of the 65 awardees who have become eligible for faculty appointment, all have received tenure-track or equivalent positions," says BWF Program Officer Martin Ionescu-Pioggia, Ph.D. "The average start-up package provided by the institutions has been \$327,000."

The deadline for applying for the next series of career awards is October 2, 2000.

For more information, visit BWF's Web site at www.bwffund.org, or contact Rolly Simpson, program associate, at (919) 991-5110 or rsimpson@bwffund.org.

The award recipients for 2000, along with their institutions, disciplines, and research projects, are:

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

Massachusetts Institute of Technology

Discipline: Molecular, cellular, and developmental neuroscience

Role of T-type calcium channels in thalamic and hippocampal rhythmic activity

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

University of California-San Francisco

School of Medicine

Discipline: Immunology

The role of the innate immune system in acute and chronic hepatitis B: studies in a novel transgenic mouse model of primary HBV infection

Greg J. Bashaw, Ph.D.

University of California-Berkeley

Discipline: Molecular, cellular, and developmental neuroscience

Molecular mechanisms of attractive and repulsive axon guidance at the midline of *Drosophila*

Leonardo Belluscio, Ph.D.

Duke University Medical Center

Discipline: Molecular, cellular, and developmental neuroscience

Learning and memory in the mouse olfactory bulb

Guoqiang Bi, Ph.D.

University of California-San Diego

Discipline: Molecular, cellular, and developmental neuroscience

Spatio-temporal specificity of synaptic plasticity at single synaptic contacts

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

Baylor College of Medicine

Discipline: Endocrinology, metabolism, and reproductive science

Understanding the reproductive roles of the activins using an activin beta B knock-in model

Career Awards (Continued on page 10)

Career Awards (Continued from page 9)**Michael D. Bulger, Ph.D.**

University of Washington School of Medicine
 Discipline: Biological chemistry and macromolecular biophysics
 The relationship between organization and function at the mammalian beta-globin locus

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

Washington University School of Medicine
 Discipline: Cell function and interaction
 Analysis of the immunological synapse: a membrane-associated machine

John D. Crispino, Ph.D.

Harvard Medical School
 Children's Hospital
 Discipline: Biology of development and aging
 Functional characterization of hematopoietic transcription factor complexes

Abby F. Dernburg, Ph.D.

Stanford University School of Medicine
 Discipline: Endocrinology, metabolism, and reproductive science
 Chromosome architecture and the fidelity of meiotic segregation

Kelly S. Doran, Ph.D.

University of California-San Diego
 Discipline: Infectious diseases and microbiology
 Penetration of the blood-brain barrier in GBS meningitis

Jay T. Groves, Ph.D.

University of California-Berkeley
 Discipline: Biological chemistry and macromolecular biophysics
 Studies of cell recognition and signaling with micropatterned lipid membranes

Michael D. Hogarty, M.D.

University of Pennsylvania School of Medicine
 Discipline: Oncological sciences
BIN1: a *MYCN* interacting neuroblastoma suppressor

Lora V. Hooper, Ph.D.

Washington University School of Medicine
 Discipline: Infectious diseases and microbiology
 Molecular analysis of commensal host-microbial interactions in the intestine

Akiko Iwasaki, Ph.D.

National Institutes of Health
 Discipline: Immunology
 Defining the mechanism of immune induction and effector function in the female genital mucosa

Ursula H. Jakob, Ph.D.

University of Michigan
 Discipline: Biological chemistry and macromolecular biophysics
 Structural and functional characterization of new heat shock proteins

Benhur Lee, M.D.

University of Pennsylvania School of Medicine
 Discipline: AIDS and AIDS-related research
 HIV-1 coreceptors and their role in HIV-associated hematopoietic dysfunction

Karen L. Mohlke, Ph.D.

National Institutes of Health
 Discipline: Molecular approaches to gene function
 Genetic analysis of type 2 diabetes susceptibility

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

University of California-San Francisco School of Medicine
 Discipline: Molecular, cellular, and developmental neuroscience
 Molecular control of cell fate in the dentate gyrus

Douglas N. Robinson, Ph.D.

Stanford University School of Medicine
 Discipline: Cell function and interaction
 Studies of the mechanisms of cytokinesis using *Dictyostelium*

Julia A. Segre, Ph.D. (Honorary awardee)

University of Chicago
 Discipline: Biology of development and aging
 Epidermal barrier function

Nirao M. Shah, Ph.D.

Columbia University College of Physicians and Surgeons
 Discipline: Molecular, cellular, and developmental neuroscience
 Genetic analysis of neural circuits mediating sexually dimorphic behaviors in mammals

Roger B. Sutton, Ph.D.

Yale University School of Medicine
 Discipline: Biological chemistry and macromolecular biophysics
 Biophysical and structural investigation of Ca^{+2} in neurotransmitter release

Suzanne J. Szabo, Ph.D.

Harvard School of Public Health
 Discipline: Immunology
 T-bet, a novel t-box transcription factor that directs T-helper cell type 1 lineage commitment

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

Johns Hopkins University School of Medicine
 Discipline: Molecular, cellular, and developmental neuroscience
 Estrogen receptors and neuroprotection against excitotoxic injury

Yanping Zhang, Ph.D.

University of North Carolina-Chapel Hill School of Medicine
 Discipline: Oncological sciences
 The ARF-MDM-p53 tumor suppression pathway

So What's New?

BWF wants to expand communications about the research conducted by the scientists we support.

We therefore encourage award recipients to notify BWF about papers you will publish, major lectures you will make, or patents you will receive, as well as about any other notable achievements that have resulted, totally or in part, from BWF-funded research. We would like to hear about such items as early as possible. Also, if your institution's public information office has reported on your work, or if your work has been described in a local publication, please send us copies of the articles.

Spreading the word about your work, through FOCUS and other outlets, is one way that BWF can help make the case for supporting basic medical research. We'd like your help in this task. We will, of course, check with you before releasing any information.

Send the information to Karyn Hede, BWF, P. O. Box 13901, Research Triangle Park, NC, 27709-3901, or call (919) 991-5119, or e-mail khede@bwfund.org.

Investing in the Future of Science: BWF's Career Awards Program

Building a career in scientific research has never been an easy task, but in recent years it has become even more difficult. No longer can a talented scientist necessarily expect to become independent simply by completing the academic requirements for the doctoral degree, applying for grants, and publishing research papers.

At the Burroughs Wellcome Fund, we have always believed that to maintain the strength of the biomedical research enterprise, we must build for the future by investing in people. In 1995, BWF launched our Career Awards in the Biomedical Sciences program to identify highly talented scientists during their formative periods and provide them the support they need to become independent investigators.

We view this funding as venture capital that gives scientists early in their careers the freedom to choose their own research directions and to demonstrate the promise of those new directions to prospective employers and funding agencies.

After five years of operation, we have completed our first report on the program. *Investing in the Future of Science: The First Five Years of the Career Awards Program* highlights some of the insights and experiences of our awardees and staff.

The report:

- Shares the insights we have gained in administering the program.
- Introduces the innovative work of a cross-section of our career awardees.
- Highlights some of the career issues that these scientists face.
- Provides a summary of career management topics selected by awardees themselves and addressed at the most recent convocation of career awards recipients.

The full report is available on BWF's Web site at www.bwfund.org, or by contacting BWF at (919) 991-5100.

The accompanying profile of Dr. Peter Kwong, "Exposing the True Face of HIV," is taken from the report.

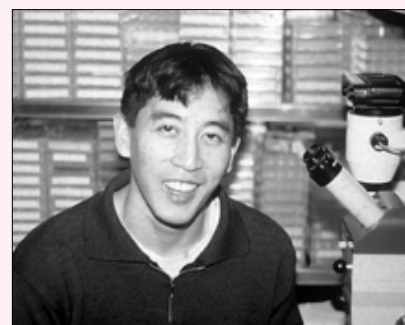
Exposing the True Face of HIV

HIV is a stunningly insidious virus, constantly, subtly shifting its structure to avoid being targeted by the immune system, even as it destroys that system. Peter Kwong, Ph.D., an associate research scientist at Columbia University College of Physicians and Surgeons and a 1998 recipient of a BWF Career Award in the Biomedical Sciences, has dedicated himself to opening new medical pathways to attack HIV by obtaining the most detailed knowledge yet of its structure.

One key element of HIV is its machinery for attacking T lymphocytes, the immune cells that are the virus's main target in the body. That machinery includes a protein called gp120, which festoons the surface of the virus, and which it uses to latch onto a receptor on the T lymphocyte called CD4, in the initial step in penetrating the cell.

Many researchers have concentrated on gp120 as a possible target for anti-HIV drugs or vaccines. But such treatments had not worked well in the past, and to understand why, scientists wanted to get a clearer look at the structure of gp120. The challenge was perfect for Dr. Kwong, who specializes in the powerful analytical technique of x-ray crystallography. Basically, this technique involves projecting x-rays through a crystalline form of a protein. By analyzing the complex pattern of diffracted x-rays produced by the protein, scientists can deduce its structure.

For Dr. Kwong and the other team members, the trick was to crystallize the gp120 protein attached to CD4. The problem was gp120's notoriously "floppy" irregular structure. But Dr. Kwong used a new approach. The research team constructed and tested slightly altered forms of the protein, looking for one whose molecular shape lent itself to crystallization. Finally, after two years, the researchers found such a molecule, and Dr. Kwong was able to obtain the gp120-CD4 structure. In June 1998, he was the lead author on the scientific paper in *Nature* announcing the new x-ray structure.



Dr. Peter Kwong

For Dr. Kwong, the achievement was only a means to his major goal.

"I'm really interested in medical application of this knowledge," he says. "The problem is it's not clear how the huge body of knowledge that's contained in the structure can be applied to something medically related. While this information does show you how clever HIV is in evading the immune system, knowing its defenses doesn't necessarily mean you can see a route to a drug or vaccine."

For example, the virus has evolved its gp120 protein so that the critical connections with its target—those that must remain constant to work—are shielded from view, so that the immune system cannot use its defenses against this segment of the virus. However, says Dr. Kwong, the detailed structure of the gp120-CD4 combination reveals intriguing cavities that drug molecules might be able to plug into to jam the infective machinery.

Dr. Kwong and his colleagues are using their structural information, working with the drug company SmithKline Beecham, to explore small molecules that might jam the infective machinery. However, Dr. Kwong points out, even if such drugs are developed, they would be expensive.

"In terms of treating the worldwide pandemic, there is no way developing countries can afford these drugs. So, if you're really going to make a broad medical impact, I think you have to find new approaches to a vaccine," he says. Unfortunately, he adds, the gp120 has not proven a good vaccine target.

"HIV has evolved all kinds of immune-evading defenses in which it avoids the antibody contacts that the immune system uses to attack viruses," he says. However, armed with the new high-resolution picture of gp120, Dr. Kwong believes that he and his colleagues may find a way to induce the immune system to attack the virus.

"The answer, in part, might be that we concentrate on regions of gp120 that can't change, such as the part that binds CD4," Dr. Kwong says. "I call this the true face of HIV, which most of the time hides deep within its structure, and I think there are ways to expose this true face of gp120 to the immune system."

BWF Awards \$5.1 Million for Studying Emerging Infectious Diseases

Alan A. Aderem, Ph.D., a professor of immunology and medicine at the University of Washington, is studying how particular immune system cells called macrophages seek out and destroy the parasites that cause leishmaniasis, a disease that afflicts more than 12 million persons worldwide.

Jon Woods, M.D., Ph.D., an assistant professor of medical microbiology and immunology at the University of Wisconsin Medical School, is studying the fungus *Histoplasma capsulatum*, in order to better understand its virulence and to help in developing new vaccines or drugs to prevent or treat infection.

Partho Ghosh, Ph.D., an assistant professor of chemistry and biochemistry at the University of California-San Diego, is using x-ray techniques to decipher the structure of iron-containing proteins in *Plasmodium falciparum*, the primary parasite that causes malaria, in hope of identifying targets that might be vulnerable to new drugs.

These sketches illustrate the range of research being conducted by the most recent recipients of Burroughs Wellcome Fund awards in emerging infectious diseases, made during our 2000 award series. BWF awarded a total of approximately \$5.1 million to 20 U.S. and Canadian scientists. It is hoped that new and more efficient methods for preventing and treating infectious diseases will be developed as a result of these programs.

"The Fund considers research on emerging infectious diseases to be an undervalued area of science, and supporting such areas is one of our primary missions," says BWF President Enriqueta C. Bond, Ph.D. "We believe that work on these diseases is rich in opportunity for achieving fundamental advances, and that foundations may be able to apply just enough support at certain critical points to shift the balance toward a positive payoff for human health."

Three scholar awards and three new investigator awards went to scientists working in molecular parasitology. "The awards are intended to encourage novel approaches to the study of parasitic diseases, such as trypanosomiasis and leishmaniasis, which are responsible for devastating human health

in many developing and tropical countries," says BWF Program Officer Victoria McGovern, Ph.D.

Worldwide, parasitic diseases afflict more than 850 million persons and kill 2 million to 3 million persons annually, and they also often undermine economic development in areas where a significant number of persons are affected.

Two scholar awards and four new investigator awards went 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 fungi.

Fungal infectious diseases pose a serious and growing health problem, in part because of the relative scarcity of safe and effective antifungal drugs, the rise in the number of people whose immune systems have been compromised by disease or drug therapy, and the relative lack of basic research on fungal pathogens.

Eight scientists are sharing seven awards made through the New Initiatives in Malaria Research program. The awards are intended to attract more investigators to work on malaria, to encourage them to bring novel approaches to studying the parasites and mosquitoes responsible for causing the disease, and to enhance scientific collaborations among investigators at the same or different institutions.

Efforts to control malaria, which kills more than 2 million persons each year, have become less and less effective during the past two decades as drug-resistant strains of the parasites have spread rapidly and mosquitoes have become increasingly resistant to insecticides.

Scholar awards, which provide \$425,000 over five years, are open to scientists who have established a record of independent research and hold a tenure-track position as an associate professor or its equivalent.

New investigator awards, which provide \$210,000 over three years, are open to scientists who hold a tenure-track position as an assistant professor or its equivalent and have established a record of independent research at the faculty level.

The malaria awards, which range from \$100,000 over two years to \$400,000 over four years, are open to scientists holding any type of tenure-track faculty appointment.

The deadline for applying for the next series of awards in emerging infectious diseases is January 16, 2001. For more information, visit BWF's Web site at www.bwfund.org, or contact Jean Kramarik, program associate, at (919) 991-5122 or jkramarik@bwfund.org.

By program area, the award recipients for 2000, along with their institutions and research projects, are:

Molecular Parasitology

SCHOLAR AWARDS

Alan A. Aderem, Ph.D.

University of Washington School of Medicine
Macrophage responses to *Leishmania* infection

Edward J. Pearce, Ph.D.

Cornell University College
of Veterinary Medicine
The role of the TGF beta superfamily
in host signaling to schistosomes

L. David Sibley, Ph.D.

Washington University School of Medicine
Molecular pathogenesis in toxoplasmosis

NEW INVESTIGATOR AWARDS

Daniel J. Eichinger, Ph.D.

New York University Medical Center
Control of encystation-specific gene
expression in *Entamoeba*

Theresa Gaasterland, Ph.D.

Rockefeller University
Comparative genome annotation of
Plasmodium falciparum, *Leishmania major*,
and *Trypanosoma brucei*

Christian Tschudi, Ph.D.

Yale University School of Medicine
The function of cis-splicing in
trypanosome RNA

Emerging (Continued on page 13)

Emerging (Continued from page 12)**Molecular Pathogenic Mycology**

SCHOLAR AWARDS

Paula Sundstrom, Ph.D.

Ohio State University School of Medicine
Global regulatory circuits and candidiasis

Michael P. Synder, Ph.D.

Yale University
Analysis of morphogenic differentiation
in *Candida albicans*

NEW INVESTIGATOR AWARDS

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

Washington University School of Medicine
Mechanisms of capsule biosynthesis
in *Cryptococcus neoformans*

Patrick J. Keeling, Ph.D.

University of British Columbia
Early infection and adaptation to intracellular
parasitism in microsporidia

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

Weill Medical College of Cornell University
Functional analysis of telomerase components
of *Candida albicans*

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

University of Wisconsin Medical School
Antisense regulation of a protein kinase
gene in *Histoplasma capsulatum*

Malaria Research Awards**Scott D. Bohle, Ph.D.**

University of Wyoming

Peter W. Stephens, Ph.D.

State University of New York-Stony Brook
Interaction of the quinoline antimalarials
and malaria pigment

Jon C. Clardy, Ph.D.

Cornell University
Inhibitors of dihydroorotate dehydrogenase
for malaria treatment

Partho Ghosh, Ph.D.

University of California-San Diego
Structural studies of *Plasmodium falciparum*
histidine-rich protein 2 (PfHrp2)

Daniel L. Hartl, Ph.D.

Harvard University
Why are there so few synonymous small
nuclear polymorphisms in *Plasmodium*
falciparum?

Anthony A. James, Ph.D.

University of California-Irvine
Genetic control of anopheline vectors

Michael A. Marletta, Ph.D.

University of Michigan College of Pharmacy
Heme detoxification in *Plasmodium*

Akhil B. Vaidya, Ph.D.

MCP Hahnemann University School
of Medicine
Plasma membrane proton pumps in malaria
parasites

Meeting Report**Quantitative Challenges of the Post-Genomic Era**

The primary sequence of human DNA that has emerged, by millions of bases each day from laboratories around the world, is only the first wave in a flood of data surging into biology.

The one-dimensional string of building blocks that comprise the DNA molecule controls the synthesis and function of three-dimensional proteins, whose conformations constantly change as they interact with the thousands of other proteins and molecules within a living cell. The sum of these connections, as revealed by rapidly emerging technology, amounts to a tidal wave of information.

Biologists typically are not trained to make sense of complexity of such magnitude. Physicists, on the other hand, are not easily intimidated by large data sets. After all, for centuries they've created theories to describe other complex systems of similar magnitude—for example, the movements of all the stars in the sky.

BWF's Interfaces between the Physical/Chemical/Computational Sciences and the Biological Sciences program seeks to attract the best minds in physics and mathematics to discover organizing principles in the current data flood, which in turn will lead to the development of new models and hypotheses that can be tested experimentally.

If the workshop/symposium "Quantitative Challenges of the Post-Genomic Era," held in January in San Diego, is any indication, the best minds in physics are not hesitating to take the plunge.

With a list of speakers that included two recent Nobel Laureates in physics, the symposium brought together fellows from five of BWF's interfaces programs, along with other trainees funded by the Alfred P. Sloan and Whitaker foundations, for five days of exposure to the "state-of-the-art" in protein structure determination, bioinformatics, protein folding, and technology development. More significantly, perhaps, the participants also heard provocative discussions of future directions for applying quantitative science to "sequence-to-function" models in biology—that is, how to make sense of all the data for the purpose of predicting protein and cellular function within living organisms.

The conference was organized by the La Jolla Interfaces in Science Program, one of six interdisciplinary training programs funded by BWF. The program is conducted by a consortium of the University of California-San Diego, the Scripps Research Institute, the Salk Institute for Biological Studies, and the San Diego Supercomputing Center.

Students and fellows in such interdisciplinary training programs face more than the usual obstacles as they seek to build careers that straddle several scientific disciplines. At most universities, permanent positions are entrenched in academic departments, and competition for these tenure-track spots is fierce. Applicants with interdisciplinary backgrounds are not always fully appreciated during the faculty selection process. Added to this is fact that

Interfaces (Continued on page 14)

BWF News Notes

BWF made 43 awards to U.S. and Canadian institutions to support visiting professorships during 2000-2001. The total includes 32 professorships in the basic medical sciences and 11 professorships in the microbiological sciences.

The professorships provide \$5,000. The visiting professors spend up to five days at the host institutions, engaging in teaching and discussion with students and faculty. They also deliver a BWF Lecture on a subject pertinent to their discipline.

The professorships in the medical sciences are supported in partnership with the Federation of American Societies for Experimental Biology and the Canadian Federation of Biological Societies. The professorships in the microbiological sciences are supported in partnership with the American Society for Microbiology.

Interfaces *(Continued from page 13)*

trainees often sense that asking for career advice is somehow "taboo."

This issue was met head-on in a number of ways during the meeting. For example, the workshop featured a panel of professors, ranging from junior faculty to department chairs, who offered their best advice on how to carve out an interdisciplinary niche in academia, and then responded to candid questions from the audience of trainees. These conversations continued over dinner, on such topics as strategies in interdisciplinary training, managing your own lab, and dual-career couples. There also was a breakfast discussion that focused on career-related issues unique to women.

In all, the workshop/symposium presented a rare opportunity for these highly talented students and fellows to present and learn cutting-edge science, to build their personal networks, and to gain professional insights that will add to their momentum as they launch their scientific careers.

— *Prepared by Nancy Sung, Ph.D.*
BWF program officer

The deadline for applying for the 2001-2002 award series is March 1, 2001. These awards will be the last that BWF will make through this program. Information about both professorships is available on BWF's Web site at www.bwffund.org.

- BWF made two awards in 2000 to support the career development of scientists working in reproductive science.

Helen H. Kim, M.D., of Harvard Medical School and Brigham and Women's Hospital, received a Reproductive Scientist Development Program/Burroughs Wellcome Fund Junior Faculty Scholar Award, which provides \$240,000 over three years. Her project is titled "Regulation of mouse GnRH gene expression."

The Reproductive Scientist Development Program (RSDP) is a consortium supported by the National Institute of Child Health and Human Development, professional societies, and foundations. The program is intended to help U.S. obstetrician-gynecologists working in the basic reproductive sciences bridge the postdoctoral years and initial faculty appointment. RSDP supports the advanced postdoctoral years and BWF supports the first three faculty years.

The deadline for applying for the next round of awards is October 1, 2000. For information, contact RSDP at (415) 476-9047.

Oliver Dorigo, M.D., of the University of California-Los Angeles School of Medicine, received an American Association of Obstetricians and Gynecologists Foundation/Burroughs Wellcome Fund Postdoctoral Research Fellowship, which provides \$183,000 over three years. His project is titled "Development of a novel gene transfer system using gutless hybrid adeno-Epstein-Barr virus for prolonged transgene expression."

BWF supports this award, which is open to U.S. and Canadian postdoctoral obstetrician-gynecologists, in partnership with the American Association of Obstetricians and Gynecologists Foundation (AAOGF).

The deadline for applying for the next round of awards is October 1, 2000. For information, contact Nora P. Smith of AAOGF at (804) 924-9921.

- Seven researchers who hold BWF awards and one researcher who is a member of a BWF program advisory committee recently were selected to be Howard Hughes Medical Institute (HHMI) assistant investigators. The researchers are among 48 scientists selected by the institute in May.

Three recipients of Career Awards in the Biomedical Sciences were selected: Rachel Green, Ph.D., of the Johns Hopkins University School of Medicine; Bruce T. Lahn, Ph.D., of the University of Chicago; and John D. York, Ph.D., of Duke University Medical Center.

Two recipients of New Investigator Awards in the Pharmacological Sciences were selected: Carolyn R. Bertozzi, Ph.D., of the University of California-Berkeley, and Raymond J. Deshaies, Ph.D., of the California Institute of Technology.

One recipient of a Clinical Scientist Award in Translational Research was selected: Matthew L. Warman, M.D., of Case Western Reserve University School of Medicine.

One recipient of an Innovation Award in Functional Genomics was selected: Leonid Kruglyak, Ph.D., of the Fred Hutchinson Cancer Research Center at the University of Washington.

Philip Green, Ph.D., of the University of Washington, who is a member of the Innovation Awards in Functional Genomics Advisory Committee, also was selected.

"These new investigators are an incredibly talented group who have begun to make their mark on biomedical research," says Thomas R. Cech, Ph.D., who assumed HHMI's presidency on January 1. Dr. Cech is a former member of the advisory committee of BWF's Career Awards in the Biomedical Sciences program. "We were looking for researchers who explore big questions and take risks—people with that special quality that leads to scientific breakthroughs and medical advances."

HHMI expects to spend between \$500,000 and \$1 million annually for salaries and research expenses of each of its new investigators and their teams, as well as for support to the investigators' host institutions for graduate training, library resources, and other needs.

BWF "Environment for Science" Grants

To complement our competitive award programs, BWF makes ad hoc grants to support activities focused on improving the environment for research. These activities generally must be closely related to BWF's targeted areas, such as career development of scientists or emerging infectious diseases. The following are recent grants:

Institute of Medicine

(\$150,000)

To support the Clinical Research Roundtable, which will provide a forum and sponsor workshops for discussion of approaches to both acute and long-term issues affecting clinical research. The grant will provide \$50,000 per year over three years. The roundtable grew out of the Clinical Research Summit, sponsored during 1998 and 1999 by the Association of American Medical Colleges and the American Medical Association, in collaboration with Wake Forest University School of Medicine. Among other activities, the roundtable will work to enhance mutual understanding of clinical research within the scientific community and the general public, while enhancing the public's participation in clinical studies.

Center for the Advancement of Health

(\$100,000)

To support an initiative titled "Biomedical and Behavioral Research: The Challenge of Integration." The two-year grant will be used to build scientific capacity for conducting behavioral research and for translating research into policy and practice. Funding for the initiative also is being provided by several other foundations, voluntary health organizations, and government groups.

Canadian Genetics Diseases Network

(\$37,000)

To support the distribution of computer-laboratory based workshops for bioinformatics to approximately 100 students at universities across Canada. The workshops are intended to provide researchers trained in biology or computer science with the skills necessary to use bioinformatics tools effectively. This grant builds on an earlier BWF grant that provided initial support for designing and delivering the workshops.

National Academy of Sciences

(\$30,000)

To support the development and distribution of a publication titled "Guidebook on the Postdoctoral Experience," by the academy's Committee on Science, Engineering, and Public Policy. BWF also made a supplemental grant of \$10,000 to help the academy evaluate its prior career-development publications.

Duke University

(\$30,000)

To support the Fifth National Institute of Allergy and Infectious Diseases Workshop in Medical Mycology. To be held in August 2000, the workshop will bring together mycologists and experts in fields that are important for better understanding of fungal pathogens. Contact Kathleen Hundley of Duke at (919) 681-1663.

Program Application Deadlines

For 2001 award series

Career Development of Scientists

Career Awards in the Biomedical Sciences
Life Sciences Research Fellowships
BWF Research Travel Grants

October 1, 2000
October 1, 2000
November 1, 2000*

Emerging Infectious Diseases

Scholar Awards and New Investigator Awards
in Molecular Parasitology
Scholar Awards and New Investigator Awards
in Molecular Pathogenic Mycology
New Initiatives in Malaria Research

January 15, 2001
January 15, 2001
January 15, 2001

Therapeutic Sciences

Clinical Scientist Awards in Translational Research
New Investigator Awards in the Pharmacological
or Toxicological Sciences

September 1, 2000
November 1, 2000

Reproductive Science

Career Awards in the Biomedical Sciences
Obstetrics and Gynecology Postdoctoral Research Fellowships
Reproductive Scientist Development Program Junior Faculty Awards

October 1, 2000
October 1, 2000
October 1, 2000

Interfaces in Science

Interfaces between the Physical/Chemical/Computational Sciences
and the Biological Sciences
Innovation Awards in Functional Genomics

To be announced[†]
To be announced[‡]

Science Education

Student Science Enrichment Program
BWF Visiting Professorships in the Basic Medical Sciences
BWF Visiting Professorships in the Microbiological Sciences

October 15, 2000
March 1, 2001*
March 1, 2001*

Environment for Science

Received all year

* This program will be discontinued after the application deadline listed.

[†] It is anticipated that these awards will be made approximately every two years. The deadline for the 2000 award series was April 10, 2000.

[‡] BWF is evaluating this program to determine its future direction. More information will be available by August 2000.

Note: If a date falls on a weekend or holiday, the deadline is the next business day.

Training the Next Generation of Biomedical Scientists

On February 14-16, 2000, the American Cancer Society, the Burroughs Wellcome Fund, and the Howard Hughes Medical Institute convened a meeting on private sector support for biomedical research training. The goal of the meeting was to address the unique contribution that private funders can make in ensuring that appropriate and adequate training programs are available for basic and clinical research. Representatives from government, academia, and nongovernmental funding agencies had the opportunity to hear presentations and discuss current programs and plans of public and private funders and to consider goals for the future.

The meeting focused on training two groups of future investigators: basic biomedical scientists and clinical scientists. In addition, cross-cutting topics were addressed, such as the move toward electronic grants-making and ethical issues facing future biomedical research.

The meeting cosponsors now have published a proceedings of the conference. This document is available on BWF's Web site at www.bwfund.org, or by contacting BWF at (919) 991-5100.

The following sections highlight the recommendations detailed in the proceedings.

Out of the sessions on training basic biomedical scientists emerged the following conclusions and recommendations:

- In the postgenomic era of research, multidisciplinary and interdisciplinary research will command center stage, requiring team approaches and the collaboration of many individuals from vastly different fields, ranging from computational mathematics to clinical science.

- The need for team approaches to scientific research suggests that private funders can make a significant difference in building expertise and collaborations by providing support to clusters of faculty.

- Support of postdoctoral students and new faculty is important, but insufficient. Philanthropy must also invest in the development of scientists from under-represented groups, provide appropriate support for foreign students, and recognize that with the globalization of the research enterprise, it will be vital to provide experiences for U.S. students abroad.

- The changing paradigm of research calls for innovations and changes in the education of scientists along the spectrum of K-12, undergraduate, and graduate education. The increasing need to value teaching in all settings could be improved by making grants that help free the time of scholar/researchers for teaching.

- The private sector can facilitate some areas or types of research more easily than can public agencies. This would include, for example, research with embryonic stem cells or prehypothesis-driven work to assemble and organize information that can provide a platform for hypothesis-driven work and infrastructure support.

- Partnerships among private funders and between the public and private sector will be valuable in moving the postgenomic research and training agenda forward and in leveraging the investments of both private sector and public sector groups.

Out of the sessions on training of clinical researchers emerged the following conclusions and recommendations:

- The development of clinical scientists is a good target for private support. As with training basic scientists, it is critically important to support clinical scientists early in their careers, although other steps in the ladder also require attention.

- The M.D.-Ph.D. is the most successful model for the development of clinical scientists. This paradigm should be supported by the private sector in order to expand the numbers of trainees at currently funded sites or to develop new programs at institutions that could then become eligible for NIH support.

- Despite the predominance of the M.D.-Ph.D. scientist, there are other essential types of physician-scientists, and these scientists require different types of support. For example, numerous new master's-level programs are in development for clinical research training. The private sector can make a contribution by assisting with tuition support. In addition, Ph.D.s who receive training in pathobiology or other human disease constructs can provide an invaluable resource to the clinical research team.

- Transition support to assist individuals at key points in their training and career development, such as between thesis work and the first independent faculty position, can be essential to prevent young scientists from leaving research. In this respect, debt relief is crucial.

- The development of multidisciplinary and generic training programs in clinical research is urgently needed, and the collaboration of disease-oriented groups could make a critical difference. Such a consortium could provide funds for junior faculty and graduate students as they make key education and career transitions.

- The private sector could support innovative mechanisms by which to develop and support mentorship skills in new and existing faculty.

At the meeting's end, several private funders agreed to pursue a joint project or collaboration in some specific area where organizations share a need and desired outcome. Possible collaborations include pilot programs to enhance the supply of clinical investigators (Ph.D. or M.D.), institutional training programs that break down departmental barriers and promote new models for training, loan repayment programs to entice M.D.s to continue in research, and career development programs.

FOCUS

This newsletter is published quarterly by the Burroughs Wellcome Fund, an independent private foundation dedicated to advancing the medical sciences by supporting research and other scientific and educational activities.

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