Section III. Breast Cancer Research Program

CONTENTS

The Disease

History of the BCRP
- Program Background
- Congressional Appropriation and Funding History

FY99 Program

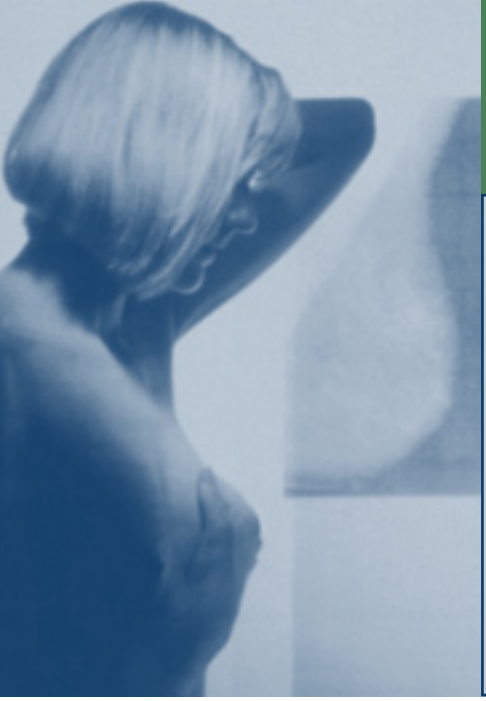
FY00 Program

Scientific Achievements
- The Food We Eat
- Viruses in the Fight against Cancer
- Computers Aid Radiologists
- Minimally Invasive Approaches Characterize Innovative Techniques for Early Detection and Treatment in Breast Cancer
- Development of Synthetic Drugs for Treatment of Breast Cancer

Summary

FY00 Integration Panel Members

CDMRP



Breast Cancer Research Program

Vision: To eradicate breast cancer

Mission: To foster new directions, address neglected issues, and bring new investigators into the field of breast cancer research.

Appropriations for Peer-Reviewed Research

$733.3M in FY92–98, $135M in FY99, and $175M in FY00 in Congressional Funds

$1.8M in FY99 and $1.3M in FY00 from the Stamp Out Breast Cancer Act

Funding Summary

1,806 awards from the FY92–98 appropriations

484 awards from the FY99 appropriation

~550 awards anticipated from the FY00 appropriation

The Disease

In the year 2000, an estimated 182,800 new cases of breast cancer are expected to be diagnosed in the United States, and more than 40,800 women are projected to die from it this year.[1] Current estimates indicate that 1 in 8 women will develop breast cancer during her lifetime.[2] Although it is the second leading cause of cancer death among American women, there is a promising downward trend in age-adjusted breast cancer mortality rates in the United States. However, among minority and lower-income women, breast cancer mortality rates are still increasing.[2]

"The Army conducts its peer review in an outstanding manner. It could serve as an example for all other agencies. I receive frequent feedback from reviewers who indicate that this is the best program they have ever been associated with; it is meritorious."

Dr. Peter Ove
Executive Secretary for BCRP

History of the Breast Cancer Research Program

——*Program Background*

The Department of Defense (DOD) Breast Cancer Research Program (BCRP) was established in fiscal year 1992 (FY92) by Appropriations Conference Committee Report No. 102-328, which provided $25 million (M) for research on breast cancer screening and diagnosis for military women and family members. In 1993, grassroots advocates influenced public policy, which led to a FY93 $210M congressional appropriation for peer-reviewed breast cancer research. After being assigned responsibility for administering the FY93 appropriation for breast cancer, the U.S. Army Medical Research and Materiel Command (USAMRMC) sought the advice of the National Academy of Sciences (NAS) to develop a sound investment strategy for the congressional appropriation. A NAS Institute of Medicine committee thoroughly studied the major considerations and, in 1993, issued a report[3] that outlined a two-tier review process and investment strategy for the

[1] American Cancer Society – *Cancer Facts & Figures 2000: Selected Cancers.*
[2] National Cancer Institute – *Cancer Rates and Risks, 4th ed., 1996.*
[3] Institute of Medicine, *Strategies for Managing the Breast Cancer Research Program: A Report to the U.S. Army Medical Research and Development Command, 1993.*

$210M appropriation. The two-tier review model has been applied to other programs within the Congressionally Directed Medical Research Programs (CDMRP). (See Section I for more detail.)

The BCRP has challenged the research community to join them in addressing their vision of eradicating breast cancer. Awards have been made across all areas of laboratory, clinical, behavioral, and epidemiological research, including all disciplines within the basic, clinical, psychosocial, behavioral, sociocultural, and environmental sciences; nursing; occupational health; alternative therapies; public health and policy; and economics. The BCRP adapts the types of award mechanisms it offers each year to meet the current needs in breast cancer research and treatment, as illustrated by the pyramid depicted in Figure III–1. The foundation of the pyramid is the training of investigators in breast cancer research. The next level of the pyramid is ideas; research starts with thousands of ideas, not all of which will lead to fruitful areas of investigation. Idea Awards have been and continue to be a major emphasis of the BCRP. The middle of the research pyramid is traditional research projects; these projects are often the major emphasis of a laboratory. Approaching the pyramid's summit are Translational awards. The BCRP focuses efforts at the critical juncture between bench and bedside research. The pinnacle of the pyramid represents the research studies that make it to a clinical trial.

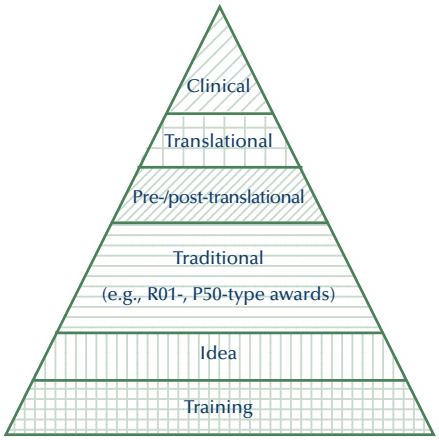


Figure III–1. BCRP Funding "Philosophy"

——*Congressional Appropriation and Funding History*

From FY92–00, Congress appropriated more than $1 billion (B) to fund peer-reviewed breast cancer research through the BCRP. A total of 2,290 awards have been made across the categories of research, training/recruitment, and infrastructure. The investment strategy executed is consistent with congressional language and reflects the program's vision to eradicate breast cancer. Appendix B, Table B–1, summarizes the directions from Congress for the BCRP appropriations, the program's withholdings and management costs, and the investment strategy executed by the BCRP for FY99–00. Additional details of the FY92–98 programs may be found in the DOD CDMRP Annual Report, September 1999.

"The scientists commented that it was useful to see a breast cancer survivor and that it helped to 'put a face' on the disease. This was especially useful for first-time scientist reviewers."

Esther Fussell,
Consumer
Peer Review Panel

Consumer Involvement in the BCRP

The BCRP is a known leader for expanding the role of consumers to include participation in all levels of the review process and on advisory panels. The goal for consumer participation is to involve breast cancer consumers from all backgrounds, thus ensuring that the perspectives of survivors are represented. This is consistent with the unique research agenda of the CDMRP to address disease-targeted research. Consumers first served on the breast cancer Integration Panel in FY93 and were included on breast cancer scientific peer review panels in FY95. Since then, 453 breast cancer survivors have served on 214 review panels. The success of consumer involvement in the BCRP has led to consumer inclusion in other programs managed by the CDMRP. The CDMRP now serves as a model to other funding agencies for consumer inclusion. For more information on consumer involvement in CDMRP, see Section I. ✦

FY99 Program

In FY99, Congress appropriated $135M for peer-reviewed breast cancer research. In addition, $1.8M was received as a result of the Stamp Out Breast Cancer Act of 1997 (Public Law 105-41). As in previous years, the central theme of the BCRP was innovation. The programmatic vision was implemented by requesting proposals in three award categories: (1) research, (2) training/recruitment, and (3) infrastructure.

"I feel good after reviewing the proposals, even though I was initially nervous. I get an education each time I participate."

Grace Shih
Consumer
Peer Review Panel

A special emphasis of the FY99 BCRP was clinical translational research, the critical juncture between laboratory research and bedside applications. This emphasis was reflected in three new award mechanisms that expanded on the Clinical Translational Research (CTR) Award, a mechanism that provides a means to extend recent findings in breast cancer research into the practice of breast cancer care. Two of the new awards, the CTR Fellowship Award and CTR Career Development Award, provided training opportunities for physicians in translational research. The third award, the Collaborative-Clinical Translational Research (C-CTR) Award, was established with the goals of (1) developing new consortium models that include academic centers, community-based oncology practices, consumer/survivor groups, and the private sector for the express purpose of performing clinical trials; and (2) testing new agents or technologies to accelerate the eradication of breast cancer. In FY99, a $1.7M C-CTR award was made to the University of Alabama at Birmingham (UAB) for coordinating the efforts of the UAB Comprehensive Cancer Center, private pharmaceutical companies, Georgia Cancer Specialists and the Southeast Cancer Network (area oncology groups), and the Susan G. Komen Foundation in Alabama and Georgia. Completion of three to four breast cancer clinical trial protocols annually is anticipated from this single collaboration.

New mechanisms were also designed to (1) enable investigators at Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) to collaborate, train, and acquire the knowledge and experience needed to conduct breast cancer research; and (2) develop a program to increase the number of HBCU/MI investigators focused on breast cancer research. In FY99, two HBCU/MI Focused Training Awards were funded; the awardees were Florida A&M University and Xavier University.

In addition to the six new mechanisms described above, the FY99 BCRP offered six established award mechanisms, as listed in Table III–1. For a full description of these established BCRP award mechanisms, see the DOD CDMRP Annual Report, September 1999.

Table III–1 reflects, in terms of dollars and number of awards, the funding summary for the FY99 BCRP.

Table III–1. Funding Summary for the FY99 BCRP Awards

Category Mechanism	Number of Proposals Received	Number of Awards	Investment
Research			
Idea Awards	892	218	$73.5M
CTR Awards	20	2	$4.5M
Concept Awards[1]	1,772	98[2]	$7.3M
Infrastructure			
C-CTR Awards[1]	2	1	$1.7M
Training Awards			
Predoctoral Traineeship Awards	128	74	$4.7M
Postdoctoral Traineeship Awards	142	60	$8.3M
Career Development Awards (CDA)	75	18	$4.1M
Institutional Training Grants	16	11	$7.9M
CTR Fellowship Awards[1]	1	0	0
CTR CDA[1]	2	0	0
HBCU/MI Focused Training Awards[1]	3	2	$0.3M
HBCU/MI Partnership Training Awards[1]	0	0	0
TOTAL	**3,053**	**484**	**$112.3M**

[1] New FY99 Award Mechanisms
[2] An additional 206 Concept Award proposals were placed on an alternate list for consideration by the FY00 program.

The 218 Idea Awards funded in FY99 include 7 awards that were supported with the $1.8M received by the DOD prior to November 1999 as a result of the Stamp Out Breast Cancer Act. Idea Awards, a well-recognized backbone of the BCRP, are intended to encourage innovative approaches to breast cancer research. The Stamp Out Breast Cancer Act led to the U.S. Postal Service's issuance of a new first-class stamp, the breast cancer stamp, which costs 40 cents and can be purchased on a voluntary basis by the public. Net revenues from the breast cancer stamp are to be used to support breast cancer research at the National Institutes of Health and the DOD. The DOD receives 30% of the net revenues from the sale of this stamp. In July 2000, new Stamp Out Breast Cancer Act legislation extended the sale of the breast cancer stamp for 2 additional years through the summer of 2002.

As illustrated in Figure III–2, the portfolio of research supported by the FY99 BCRP is quite diverse. The largest investment is in basic sciences in the discipline of cell biology (24%). The second largest investment is in clinical research in the field of clinical and experimental therapeutics (16%).

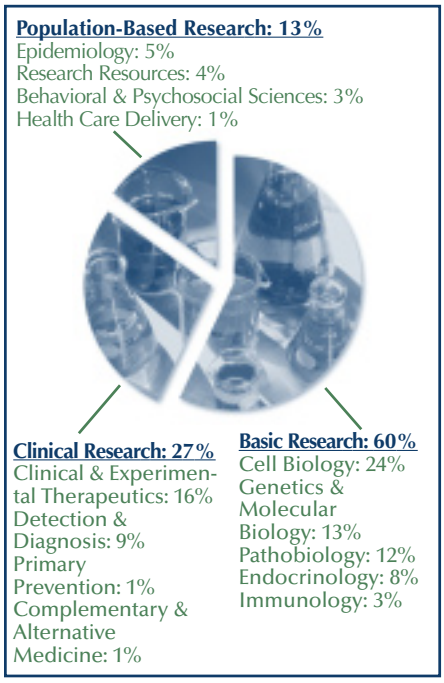


Figure III–2. FY99 BCRP Portfolio by Research Area

Challenging Investigators to Develop New Concepts

To support the mission of the CDMRP to develop new and innovative means of expediting research, the BCRP executed a fast-track proposal submission, review, and negotiation process for Concept Awards. This new award mechanism was offered through a supplemental, February 17, 2000, Program Announcement. The intent of Concept Awards is to fund an initial concept or theory that could give rise to a testable hypothesis. These awards were designed to encourage the exploration of untested, innovative questions in breast cancer. The response of the scientific community to the Concept Award solicitation was enthusiastic—1,772 proposals were received electronically. Ninety-eight proposals representing a diverse portfolio were funded with FY99 funding. An additional 206 Concept Award proposals were placed on an alternate list for consideration by the FY00 program. ✦

FY00 Program

In FY00, Congress appropriated $175M for peer-reviewed breast cancer research. In addition, $1.3M was received as a result of the Stamp Out Breast Cancer Act that will be used to fund approximately three Idea Award proposals. In addition to offering 10 established award mechanisms, four new mechanisms designed to support areas underrepresented in breast cancer research were launched in FY00.

- The Clinical Bridge Award mechanism was developed to sponsor novel research that can lead to a clinical trial. The Bridge Award is intended to support either preclinical studies developing a lead agent or postclinical trial follow-up.
- The Virtual Breast Cancer Center of Excellence Award was designed to support the establishment of electronic (virtual), multidisciplinary, multi-institutional collaborations that would accelerate finding a solution to overarching problems in breast cancer and advance the research.
- The intent of Behavioral Center of Excellence Awards is to invigorate the behavioral research community by engaging experts from multiple disciplines to establish centers of excellence that will advance investigations in behavioral breast cancer research.
- The aim of the Undergraduate Summer Training Program is to attract talented students to careers that focus on breast cancer research by providing educational and training opportunities for undergraduate students at an important career decision-making point.

In response to the FY00 BCRP Program Announcement, 1,234 proposals were received. Scientific peer review was conducted in August/September 2000, and programmatic review is scheduled for November 2000. More than 350 awards are anticipated.

Scientific Achievements

The BCRP research portfolio comprises many different types of projects, including training of graduate students and postdoctoral fellows, innovative research, translational studies, and clinical trials, that take discoveries to the bedside. Award mechanisms are intended to foster training, challenge existing paradigms in science, and quickly advance breast cancer detection, diagnosis, treatment, and interventions to enhance quality of life.

The outcomes of BCRP-funded research can be gauged, in part, by the number of resultant publications, abstracts/presentations, and patents/licensures reported by awardees to date. This information is summarized in Table III–2.

Table III–2. Outcomes

Publications in Scientific Journals	~2,300
Abstracts/Presentations at Professional Meetings	~1,800
Patents/Licensures (including applications)	30

Many of the research awards are in disciplines that comprise fundamental biological sciences. Investigators supported by these awards include graduate students who are initiating their careers in breast cancer research, established investigators who are recruited to breast cancer research, and well-known breast cancer researchers. BCRP-supported projects have led to breakthroughs in the identification of genetic risks for familial breast cancer, the actions of hormones in breast tissue, and the development of new therapies.

The following projects represent a sampling of the many exciting developments that are resulting from research funded by the BCRP.

——*The Food We Eat*

A chemical class of compounds in foods we eat that can affect the growth of breast cancer: Indoles are naturally occurring plant products present at high levels in vegetables such as broccoli, cabbage, and brussel sprouts. Animals fed indoles have 50% fewer spontaneous breast cancers; however, it was unknown how this chemical protects breast tissue. Researchers at the University of California at Berkeley found that high, nonphysiological levels of indoles can slow the growth of breast cancer cells in culture. More importantly, these researchers found that indole levels that can be achieved through dietary intake can reduce the expression of genes involved in the regulation of new blood vessel growth (angiogenesis) and downregulate factors that control metastasis. These results support the exciting hypothesis that dietary indoles may be novel antiangiogenic factors and may result in the development of a new class of antitumor agents.

Better compliance with diets being tested for prevention of breast cancer: The ability of fruits and vegetables to prevent cellular damage, which may help prevent cancer, is being evaluated in women at high risk for breast cancer by a research team at AMC Cancer Center in Denver, Colorado. The research team has made extensive use of focus groups to identify critical areas that could impact the success of the study, including convenience, choice of foods, and flexibility needed when eating away from home. These key issues were addressed in a number of ways, including partnering with a local grocery chain to develop frozen entrees for the study participants. In addition, the key element in the intervention, a cookbook, was extensively revised to make meal preparation easier and to give study participants greater flexibility in choosing foods. The investigators felt that these changes would result in better compliance with the study diet for participants. In the coming years of the study, participants will have blood and urine samples tested for markers of cell damage to determine whether this type of dietary intervention can protect against breast cancer.

——*Viruses in the Fight Against Cancer*

Injecting a virus directly into breast tumors to reduce size: Reovirus is a virus that is commonly found in the lungs and digestive system. It is normally not of clinical concern, since few, if any, symptoms develop after reovirus infection occurs. A research team from the University of Calgary, Alberta, Canada, is studying the direct effect of this virus on breast cancer cell lines. This team has discovered that this virus exploits an activated Ras signaling pathway in the host cell for infection. Normal cells do not have an activated Ras signaling pathway while up to 30% of cancer cells do. In the first year of the study, the researchers found that reovirus killed all of the tumor cell lines tested, but noncancerous cells were resistant to the virus. Moreover, in an animal model, the team found that not only did the injected virus shrink the size of the tumor directly treated, but other experimental tumors in the same animal also regressed in size. These findings raise the possibility that systemic delivery of this virus may be an effective therapy against breast cancer.

Using gene therapy as a vehicle for delivering target molecules to breast cancer: Gene therapy holds great promise as a mechanism to administer compounds that are either difficult to manufacture in sufficient quantity or are metabolized (i.e., changed into a different nonfunctional form) before reaching the site where they are needed in the patient. A gene coding for a toxic compound that can kill tumor cells is attached to a common virus that can be administered to patients. Once the modified virus is in the body, the added compound is directly manufactured in the patient. Challenges must be met for gene therapy to be a practical option in the treatment of breast cancer. Two of these challenges are: (1) overcoming the toxic side effects of the viral vector and (2) developing a molecule to target tumor cells. Researchers at the Mount Sinai School of Medicine in New York are addressing these issues. This research team is using adenovirus, a virus that causes the common cold, as the vector to carry genes into cancer cells.

Previous attempts at gene therapy using this vector in animal models have had unacceptable side effects, including liver damage. However, these researchers have modified an adenovirus and demonstrated a lack of systemic toxic side effects in animal experiments. To address the other gene therapy challenge, a newly discovered protein, endostatin, is being used as a the molecule to target tumors. Endostatin can prevent the growth of new blood vessels. Animal experiments have shown that delivery of the endostatin gene in a modified adenovirus slowed the growth of tumors and their metastases. Combining this gene therapy approach with other tumor therapies is likely to have additive or synergistic effects, enhancing the effectiveness of therapy.

"The DOD Peer-Reviewed BCRP continues to be a broad-reaching, influential program forging new and innovative directions for breast cancer research and science. This program is unique in that it brings scientists and consumers together to make policy decisions. It has become a model that other research programs have sought to replicate."

National Breast Cancer Coalition

——Computers Aid Radiologists

Computer technology helps radiologists identify overlooked small breast cancers: Breast cancer is most curable in its early stages, and mammography is the common method for reliably identifying early-stage breast cancer. Despite mammography's proven value, however, many small cancers are difficult to see on mammograms and can elude detection. Computer Aided Diagnosis (CAD) is an electronic enhancement technique that can augment mammography by graphically drawing radiologists' attention to suspicious lesions, thereby improving detection by serving as a second reader. Researchers at the University of Chicago have developed and used a CAD Prototype Workstation in which a laser scanner transforms the mammography film into a detailed matrix of digital data. The system's computer vision and artificial intelligence algorithms scan this matrix, sift out background findings and normal soft tissue, and then highlight abnormal patterns that are likely to represent areas of cancer. Using this tool, these investigators reviewed mammograms of more than 22,000 women who had routine screenings in the past 5 years. Among the first 12,670 women whose charts have been analyzed, 79 developed breast cancer. Although many of the cancers that developed were eventually found through screening mammography, 23 women had had an earlier screening mammogram that was interpreted as negative on which the cancer was visible in retrospect when using the CAD technique. The CAD workstation reviewed these stored mammograms and was able to identify 52% of missed cancers—roughly a year before they were actually detected.

——Minimally Invasive Approaches Characterize Innovative Techniques for Early Detection and Treatment in Breast Cancer

Screening breast duct fluid may identify atypical cells before cancer develops: Scientists have long believed that even the tiniest tumors visible on mammograms have been growing for at least 8 to 10 years and that most breast cancers arise in the lining of milk ducts. Until now, routine sampling of ductal cells—a logical approach to detect atypical cells that are often precursors to cancer—has been impeded by two obstacles: (1) the lack of a map of the ductal system and (2) the lack of a minimally invasive device to withdraw cells from the ductal lining. An anatomical diagram of the breast ductal system was constructed

by investigators at the University of California at Los Angeles based on information obtained from physical exams, x-ray images, and breast tissue dissection and examination. Using this diagram, these researchers demonstrated that each breast has an average of five to nine unconnected milk ducts that extend from the nipple area back to the chest wall. With a clear picture of the ductal system, researchers were able to develop a device to retrieve ductal cells. The device is a special catheter that contains two very narrow tubes; one is used to inject a solution into the duct, and the other is used to retrieve the solution from the duct. The process is called "ductal lavage" and results in the recovery of a sample of ductal fluid. If the fluid contains abnormal cells, the cells can be identified before they become invasive breast cancer. In a clinical trial of this device, preliminary findings show that it identified abnormal cells (cells that could develop into cancer) in 24% of the population (92/283). This technique is more sensitive than suction cup technology, in which only 10% (41/417) of the population had identifiable abnormal cells. The device has received FDA approval, and the procedure is available in selected breast cancer centers in the United States and Europe.

Test for tumor markers may identify women with high potential for metastasis: A research team in the Department of Molecular Oncology, John Wayne Cancer Institute, Santa Monica, California, has developed a system to detect tumor markers in the blood of breast cancer patients. The test uses the Origen detection instrument combined with electrochemiluminescence technology to detect specific cDNA gene products. The new system has been tested on patients recently diagnosed with breast cancer; 45 of the 65 patients (69%) showed the presence of at least one of four tumor markers known to be expressed by breast cancer cells. These patients are being followed to see whether the presence of these markers can accurately predict metastasis or disease recurrence. These findings are a critical first step toward the goal of diagnosing and treating cancer metastases before formation of tumors that can be detected with current technologies. If validated, this would mean that a simple, minimally invasive blood test could identify the spread of cancer while it is occurring and before it is clinically detectable by conventional methods. In addition to improved detection, the results of this test could also be used to help make decisions about the most appropriate therapy for individual patients.

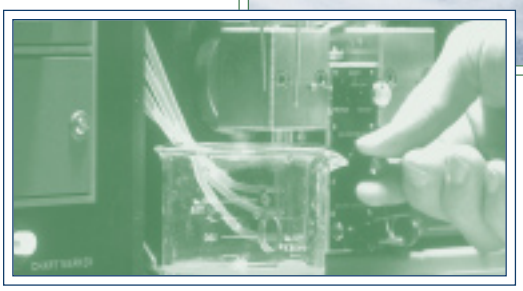
Laser treatment could replace surgical intervention for some women: Investigators at the National Medical Laser Centre in London developed an experimental laser treatment for small, localized breast cancer tumors that could become a less invasive alternative to lumpectomy for some patients. This treatment involves delivery of low-power laser light directly to the tumor to gently heat and kill the tumor cells. The laser is delivered to the tumor via thin needles threaded with optic fibers. The needles are inserted directly into the tumor via the skin. Diagnostic Magnetic Resonance Imaging (MRI) scans are performed before and after laser treatment and compared to assess whether any areas of cancer can still be detected. In a clinical trial of this technique, patients underwent

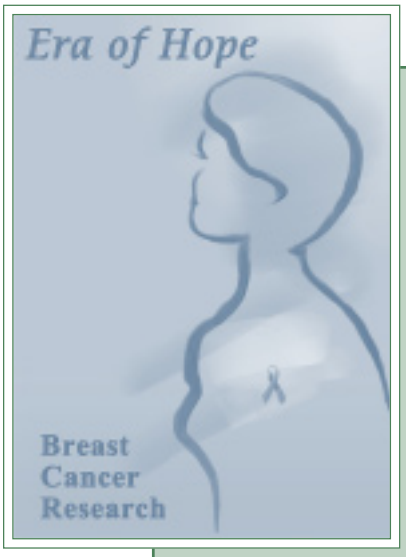
conventional surgery to remove the entire cancer area in the breast subsequent to the laser treatment and MRI scans. The tissue that was removed during surgery was examined under a microscope and compared with the MRI images. The research team found good correlation between the post-laser MRI images and clinical measurements of the surgical specimen for both the true extent of the cancer and the extent of laser-induced destruction. This treatment shows significant promise as a simple, low-risk alternative to surgical lumpectomy for women with small, localized breast tumors.

——Development of Synthetic Drugs for Treatment of Breast Cancer

Synthetically produced microtubule-stabilizing agents with Taxol™-like actions but minimal drug-resistance: Since the original discovery of Taxol, the epothilones—isolated from the myxobacterium Sorangium cellulosum—are the first class of microtubule-stabilizing agents with Taxol-like mechanisms of action. In cultured cells and in vitro, the epothilones mimic all biological effects of Taxol, which is one of the most effective drugs currently available for the treatment of breast cancer. In addition, the epothilones possess several advantages over, and may prove superior to, Taxol in the treatment of breast cancer. However, the availability of epothilones is limited. Researchers at Sloan-Kettering Cancer Center, New York City, have developed and produced synthetic epothilones that are not only cytotoxic but are hundreds to thousands of times more effective than Taxol in some drug-resistant cell lines. In preclinical studies in mice, these researchers demonstrated the antitumor effectiveness of epothilone desoxyepothilone F; it reduced tumor size to the point of remission within 50 days. Synthetic epothilones show promise as superior drug candidates against breast cancer.

Building cancer vaccines with carbohydrate antigens: Employing the formidable resources of the human immune system to cure cancer has been a longstanding vision of medicine. Ideally, a vaccine containing a particular tumor-associated antigen or a range of cell-surface antigens, presented in an effective immunostimulatory context, would trigger immunity against cancer cells expressing counterpart structures on their surfaces. A team of researchers at the Sloan-Kettering Cancer Center have targeted carbohydrate-based antigens, such as glycolipids or glycoproteins, that are expressed on the accessible surfaces of tumor cells. A glycal method to synthesize large quantities of these complex carbohydrate antigens, which are extremely difficult to isolate from natural sources, was developed. The chemical syntheses of two of these antigens (globo-H and KH-1) and their allyl glycoside counterparts were successfully completed. In addition, these allyl glycosides were conjugated to a carrier protein KLH (keyhole limpet hemocyanin) and then were used along with an adjuvant QS-21 as vaccines. Both of these vaccines elicited immune responses in mice; moreover, the globo-H vaccine was effective in eliciting IgM immune responses in an initial clinical trial of five cancer patients.





ERA OF HOPE 2000: Bringing Together the BCRP Partners

The Era of Hope meeting provided an opportunity to bring together the individuals who constitute the unique partnership among the U.S. Government, the research community, and breast cancer consumers. This meeting was a pivotal event in the execution of the BCRP and its commitment to respond to the vision and dedication of all partners. The Era of Hope was a multidisciplinary conference that provided participants the means to share ideas with peers and a wide audience of stakeholders searching for new approaches for the prevention, detection, and treatment of breast cancer and enhanced quality of life for patients. This second Era of Hope meeting provided a forum for new collaborations, and initiated innovative approaches to tackling difficult breast cancer research issues.

The meeting was organized around three unifying themes in a variety of sessions: (1) conversion of normal to malignant cells; (2) impact of external factors on carcinogenesis and the neoplastic cell; and (3) the role of the vasculature in breast cancer—a model for intervention and early detection. Each session was designed to progress from basic science through translational research to the clinical perspective, as well as to address the impact of the research on the consumer. The tone of the meeting was set by the keynote speaker on the first night. Dr. Stanley Cohen, a Nobel laureate in chemistry, discussed his early research on growth factor receptors, laying the groundwork for discussion of HER-2/*neu*, a growth receptor frequently overexpressed in women with highly aggressive breast cancer. Growth factors are thought to be responsible for the transformation of normal cells to cancerous cells. Development of the drug Herceptin, which was partially funded by the BCRP, specifically targets the HER-2/*neu* receptor. This drug is currently a very successful treatment for some breast cancer patients.

A total of 133 DOD BCRP grantees highlighted their most recent scientific accomplishments in the general sessions and 793 awardees presented poster sessions for 1,018 participants, including other renowned scientists, physicians, health care providers, and consumers.

Media coverage of the Era of Hope 2000 meeting included the broad scope of the research funded by the DOD, as well as the unique aspects of the DOD BCRP. Over 250 news stories resulted from interviews with local and national news media outlets, including *Time* magazine, *The Boston Globe*, and the *New York Post*. Over 30 interviews were broadcast live to local markets across the country.

The Era of Hope 2000 abstracts, available on the CDMRP web site at http://cdmrp.army.mil, demonstrate the breadth and depth of the innovative research funded by the DOD BCRP and describe the advancements made since the inception of the program. ✦

"One of the most stimulating meetings I attended in many years. The human touch of the survivor participation provides us with the real reason and meaning of our work."

Participant in the 2000 Era of Hope Meeting, Atlanta, GA

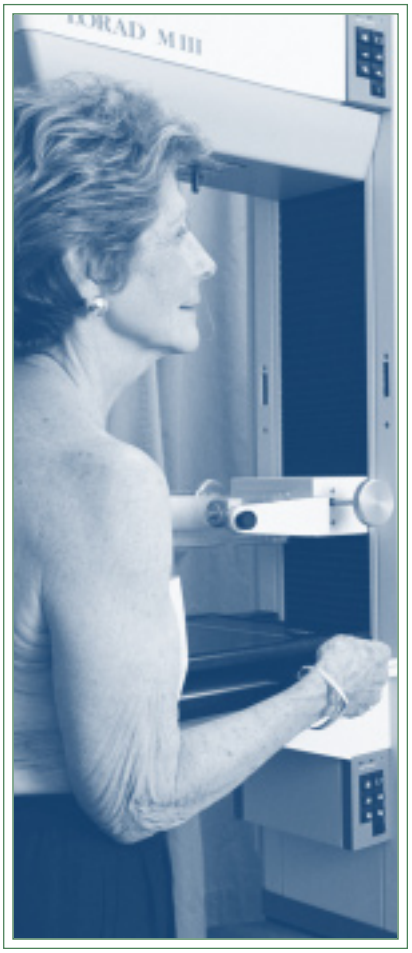
"Science and passion and urgency and a human face will help us solve these problems."

Participant in the 2000 Era of Hope Meeting, Atlanta, GA

For more information about the BCRP and other programs managed by the CDMRP, visit **http://cdmrp.army.mil**

Summary

Breast cancer, in its complexity, has many fronts for potential attack. The areas of focus of the DOD BCRP span the spectrum, from basic science to clinical translation. The BCRP offers benefits to the breast cancer patient through channeling research in directions that stimulate and reward these innovative ideas. The achievements of this program have contributed to eradicating breast cancer. The BCRP will be continued in FY01 with a congressional appropriation of $175M.



FY00 Integration Panel Members

***Chair*, Fran Visco, Esq.:** Consumer; Attorney. President and Member of the Board of Directors of the National Breast Cancer Coalition. Member of the President's Cancer Panel. Co-chair of the National Action Plan on Breast Cancer. Member of the National Cancer Policy Board.

***Chair Emeritus*, Anna Barker, Ph.D.:** President and Chief Executive Officer, BIO-NOVA, Inc. Member of the Board of Directors and Chairperson of the Science Policy and Legislative Affairs Committee of the American Association for Cancer Research. Member of the Board of Directors, National Coalition for Cancer Research.

Daniel Acosta, Jr., Ph.D.: Dean, College of Pharmacy, University of Cincinnati. Vice President-Elect of the Society of Toxicology.

John Boone, Ph.D.: Professor, Department of Radiology, University of California at Davis.

Thomas Burish, Ph.D.: Provost, Professor of Psychology and Medicine, Vanderbilt University. Member of the Board of Directors of the American Cancer Society.

M. Carolina Hinestrosa: Consumer; Co-Founder and Director of Programs, Nueva Vida, the first Spanish-language support and referral network for Latinas with breast cancer in the Washington, DC, metropolitan area.

Gabriel Hortobagyi, M.D.: Professor of Medicine, Nellie B. Connally Chair in Breast Cancer Research, and Chair, Department of Breast Medical Oncology, The University of Texas M. D. Anderson Cancer Center. Past President and Member of the Board of Directors of the International Society of Breast Disease.

Lawrence Kushi, Sc.D.: The Ella McCollum Vahlteich Professor of Human Nutrition, Columbia University.

Lynn Matrisian, Ph.D.: Professor and Chair, Department of Cancer Biology, Vanderbilt University School of Medicine, and Program Leader of the Host-Tumor Interaction Program of the Vanderbilt-Ingram Cancer Center. Served on the Board of Directors of the American Association for Cancer Research.

Lori Pierce, M.D.: Associate Professor, Research Investigator and Director, Clinical Division, Department of Radiation Oncology, University of Michigan School of Medicine.

Frank Rauscher III, Ph.D.: Professor and Chair, Molecular Genetics Program, The Wistar Institute, and Deputy Director, The Wistar Institute Cancer Center, Philadelphia, Pennsylvania. Editor-in-Chief, *Cancer Research*.

Rosemary Rosso, JD: Consumer; Senior Attorney at the Federal Trade Commission. Member of the National Breast Cancer Coalition and the Baltimore/Washington Breast Cancer Group.

Eric Rowinsky, M.D.: Director of Clinical Research, Cancer Therapy and Research Center, Institute for Drug Development. Clinical Professor of Medicine, University of Texas Health Science Center, San Antonio.

Andrew Seidman, M.D.: Assistant Professor of Medicine, Cornell University Medical College. Assistant Attending Physician, Breast Cancer Medicine Service, Memorial Hospital. President, American Society of Breast Disease.

Dennis Slamon, M.D., Ph.D.: Executive Vice-Chair for Research for the Department of Medicine, Professor of Medicine, and Chief of the Division of Hematology-Oncology, University of California at Los Angeles School of Medicine. Director of Clinical Research, Jonsson Comprehensive Cancer Center, University of California at Los Angeles.

George Sledge, M.D.: Professor of Medicine and Pathology at Indiana University School of Medicine and Ballvé-Lantero Professor of Oncology (Endowed Chair). Vice Chair of the Breast Cancer Committee. Editor-in-Chief of *Clinical Breast Cancer*.

Patricia Steeg, Ph.D.: Chief, Women's Cancers Section, Laboratory of Pathology, National Cancer Institute, National Institutes of Health.

David Thomas, M.D., Dr. P.H.: Head, Program in Epidemiology, Fred Hutchinson Cancer Research Center. Professor, Department of Epidemiology, School of Public Health and Community Medicine, University of Washington.

Nicole Urban, Sc.D.: Member of the Cancer Prevention Research Program, Fred Hutchinson Cancer Research Center. Associate Professor, Department of Health Services, School of Public Health and Community Medicine, University of Washington.