

Chapter 2: Initiatives

The current mechanism of peer-reviewed, investigator-initiated research project grants has served us very well over the years. This approach should be continued and enhanced.... Additional pathways are needed, however, to support important research not currently well served by existing mechanisms.
Charting the Course: Priorities for Breast Cancer Research

As the leader of the National Cancer Program, the NCI provides vision and direction to the nationwide community of researchers, public health workers, health care providers, patients, advocates, and policy makers working to defeat cancer. In this capacity, the NCI is responsible for coordinating, conducting, and funding programs in basic research, training, and public health that pertain to the diagnosis, prevention, and treatment of cancer.

The largest share of NCI funding for biomedical research supports investigator-initiated applications. This approach enables individual scientists to design and focus on research projects that they believe have the greatest significance and offer the best chance of producing important knowledge. The investigator-initiated cancer research portfolio extends broadly across research fields and disciplines.

Research is also solicited and resources are developed through the use of *initiatives*, which encourage work in priority areas, support multidisciplinary research collaborations, and generate research applications in areas that are not addressed adequately. Initiatives permit the NCI to take advantage of scientific opportunities in a timely way. They also provide funding to overcome barriers to progress and allow investigators to pursue new research that is outside their area of expertise. Initiatives soliciting breast cancer research are used by the NCI to address priorities that might not otherwise be addressed through investigator-initiated research proposals. In the broadest sense, initiatives include the following:

- The extramural funding opportunities used for establishing new projects, resources, and programs
- The resources and programs that result from these funding opportunities
- The resources and programs that the NCI establishes within its intramural programs

A recurring theme throughout the 1998 Breast Cancer PRG report was that progress in highly promising avenues of breast cancer research is being delayed because of limitations in knowledge, resources, infrastructure, or capacity needed for conducting this work. To address these limitations, PRG members generated a list of the most important scientific priorities and recommended actions in breast cancer biology, etiology, genetics, prevention, detection, treatment, cancer control, and outcomes. These topics are addressed in Chapters 3-8 of this report. In addition to these recommendations, the 1998 Breast Cancer PRG identified 13 critical areas of equal priority spanning the continuum of breast cancer research and care:

- Increase basic research on the biology and developmental genetics of the normal mammary gland.
- Develop better model systems for breast cancer.
- Increase research on the genetics and biology of precancerous lesions and their progression to invasive, metastatic cancers.
- Identify key biomarkers and surrogate endpoints for epidemiologic studies and prevention and therapy trials.
- Enhance availability of new technologies and funding for equipment.
- Facilitate novel therapeutic approaches in academic health centers and via public/private partnerships.
- Modify and enhance support for prevention and therapy clinical trials.
- Ensure that all breast cancer basic and clinical research and communications efforts reflect and address patient and survivor needs and concerns.

- Increase focus on and support for basic and applied research into biobehavioral mechanisms and decision making relevant to cancer prevention, detection, and treatment.
- Expand training opportunities and support, especially for multidisciplinary training of translational investigators and to attract new talent to breast cancer research.
- Promote multidisciplinary research focus and communication.
- Develop mechanisms to support innovation and enhance support for specific areas of research.
- Address informed consent and confidentiality issues.

The NCI has responded to the 1998 PRG priorities and recommendations by expanding its investment in solicited breast cancer research. By expanding ongoing initiatives and introducing new initiatives targeting priority research topics, the NCI provides focused support and guidance for researchers pursuing breast cancer studies. By supporting initiatives that provide infrastructure and resources, the NCI facilitates research projects that rely on centralized, shared resources and collaborations. Many of these initiatives and resources are, appropriately, not limited to or specific for breast cancer, but their availability facilitates the efforts of those focusing on breast cancer research.

NCI's Investment and Response

Chapter 1 shows the growth in NCI spending on breast cancer research (Figure 1-3) and lists the specific initiatives that addressed breast cancer (Table 1-1) during the period 1998-2003. In this chapter, detailed information is provided for initiatives that are relevant to more than one research category. This information includes a description of the initiative, relevant research categories, and the program, resource, research projects, and/or products that resulted from the initiative (Table 2-1). For each initiative in Table 1-1 that applies to a single research category, more detail is provided in the report chapter that corresponds to the category.

Table 2-1. NCI Initiatives Relevant to Breast Cancer Research: Initiatives Affecting Multiple Research Categories^a

Initiatives Focused on Breast Cancer

- Aging Women and Breast Cancer (PA-00-001)
 - ◆ Overview: Supports research that focuses on the unique problems of older women with breast cancer.
 - ◆ Research Categories: All.
 - ◆ Relevant Projects Resulting From This PA: Between 1998 and 2003, 11 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B2, B9, B16, B23, B33, B40, B41, B43, B46, B51, B54, and B55, by searching for the current PA number and the previously issued PA number (PA-96-034).
- Breast and Ovarian Cancer Family Registries (CFRs) (<http://epi.grants.cancer.gov/BCFR/index.html>)
 - ◆ Overview: Maintains tissue specimens and treatment information provided by over 9,000 families with a history of breast or ovarian cancer.
 - ◆ Research Categories: Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Resource Related to This Initiative: The CFR resources are available to researchers to support studies in genetic epidemiology, clinical investigations, social and behavioral epidemiology, and health policy research. CFR data were used in more than 100 published reports between 1998 and 2003.

a. Lists of projects derived from initiatives can be found on the online Supplement to the Breast Cancer Progress Report: Initiatives Database.

- Breast Cancer Faculty (<http://ccr.cancer.gov/faculties/faculty.asp?facid=129>)
 - ◆ Overview: Facilitates interactions among basic, epidemiological, translational, and clinical researchers in the NCI intramural research program in an effort to promote a community of investigators working together for the prevention, diagnosis, and cure of breast cancer. More than 200 NCI and NIH faculty members participate in a monthly seminar series and annual retreat to facilitate communication and collaborations among laboratories.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Program Resulting From This Initiative: Recent accomplishments include the establishment of consensus nomenclature for the comparative pathology of genetically engineered mouse and human breast lesions and the development of the NCI Mouse Model for Mammary Cancer Collective, which is a component of the Mouse Models of Human Cancers Consortium.
- Breast Cancer Surveillance Consortium (BCSC) (<http://breastscreening.cancer.gov/>)
 - ◆ Overview: Supports studies that investigate the factors influencing screening mammography performance in community practice. In addition to conducting research that evaluates screening mammography and its effect in populations, BCSC is actively collaborating with federal regulatory agencies, radiological professional societies, and private-sector vendors to reduce the cost and improve the quality of screening mammography performance. BCSC reviews and comments on reports and initiatives by these agencies, as well as collaborates in standardizing data collection for mammography quality control. BCSC relies on a Statistical Coordinating Center (RFA-CA-98-025) to serve as the central repository for pooled data and to provide the research expertise on complex statistical issues for analysis of these pooled data.
 - ◆ Research Categories: Prevention; Early Detection, Diagnosis, and Prognosis; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Projects Resulting From This Initiative:
 - Breast Cancer Surveillance in a Defined Population
 - Carolina Mammography Registry
 - Colorado Mammography Project
 - New Hampshire Mammography Network
 - New Mexico Mammography Project
 - San Francisco Mammography Registry
 - Statistical Coordinating Center
 - Vermont Breast Cancer Surveillance System
- Cooperative Breast Cancer Tissue Resource (CBCTR) (<http://www-cbctr.ims.nci.nih.gov/>)
 - ◆ Overview: Facilitates large research studies requiring archival tissue by supplying investigators with primary breast cancer tissues and associated clinical data.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Resources Resulting From This Initiative: Investigators can search an online database to identify breast cancer specimens that meet their specific research needs. Searches can be made based on annotated clinical characteristics, which include but are not limited to stage of disease, recurrence information, and treatment received, as well as resource characteristics, including the availability of normal (control) tissue.

- Insight Awards to Stamp Out Breast Cancer (PAR-99-128)
 - ◆ Overview: Supports innovative pilot studies to generate a new understanding of breast cancer. The focus of the program is to advance underdeveloped areas of research that were identified by the NCI Breast Cancer Progress Review Group.
 - ◆ Research Categories: All.
 - ◆ Relevant Products Resulting From This PA: Between 1998 and 2003, 47 projects relevant to breast cancer research were supported through this PA.^b
- International Breast Cancer Screening Network (IBSN) (<http://appliedresearch.cancer.gov/ibsn/>)
 - ◆ Overview: Supports collaborative research aimed at identifying and fostering effective approaches to worldwide breast cancer control through population-based screening mammography.
 - ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Program Resulting From This Initiative: Representatives from 25 countries work together to compare data from international breast cancer screening programs and to develop methods for evaluating the impact of population-based breast cancer screening programs. Working groups within this consortium include the following:
 - Case Control Evaluation Group
 - Communications Working Group
 - Group on Assessment of Organized Screening Programs
 - Mortality Evaluation Group
 - Performance Parameters Evaluation Group
 - Quality Assurance Group
- Specialized Programs of Research Excellence (SPOREs) in Breast Cancer (<http://spores.nci.nih.gov/breast/breast.html>)
 - ◆ Overview: Supports translational research centers that focus on the prevention, etiology, screening, diagnosis, and treatment of a specific organ-site cancer.
 - ◆ Research Categories: All.
 - ◆ Relevant Program Resulting From This Initiative: There are currently ten breast cancer SPORE sites, which are listed in Table 2-2. Yearly meetings are held to facilitate communication among the researchers participating in the breast cancer SPOREs and among the researchers participating in SPOREs for all cancer types.

Initiatives With Breast Cancer-Relevant Components

- Applications of Innovative Technologies for the Molecular Analysis of Cancer (PAR-01-106; PAR-01-107)
 - ◆ Overview: Supports research projects that evaluate and implement molecular analysis technologies in studies relevant to cancer research.
 - ◆ Research Categories: Biology; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Projects Resulting From These PAs: Between 1998 and 2003, 16 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B1, B2, B5, B10, B14, B19, B26, and B29-33, by searching for these current PA numbers and the previously issued PA numbers (PAR-99-102 and PAR-99-103).

b. Lists of projects derived from initiatives can be found in the online Supplement to the Breast Cancer Progress Report: Initiatives Database.

- Basic and Preclinical Research on Complementary and Alternative Medicine (CAM) (PA-02-124)
 - ◆ Overview: Provides support for CAM and conventional researchers to focus on basic, mechanistic, and preclinical research on Complementary and Alternative Medicine-based treatments for diseases such as breast cancer.
 - ◆ Research Categories: Prevention; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Projects Resulting From This PA: Pending—this PA will remain open until July 15, 2005.
- Bioengineering Research Grants (PA-02-011)
 - ◆ Overview: Supports multidisciplinary research performed in a single laboratory or by a small number of investigators that applies an integrative systems approach to develop knowledge and/or methods to prevent, detect, diagnose, or treat disease or to understand health and behavior.
 - ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Projects Resulting From This PA: Between 1998 and 2003, six projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B17, B18, B34, B51, B53, B54, and B56, by searching for the current PA number and the previously issued PA number (PAR-99-009).
- Bioengineering Research Partnerships (PAR-02-010)
 - ◆ Overview: Supports the formation of multidisciplinary research partnerships among multiple institutions that apply an integrative systems approach to develop knowledge and/or methods to prevent, detect, diagnose, or treat disease or to understand health and behavior.
 - ◆ Research Categories: Biology; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Projects Resulting From This PA: Between 1998 and 2003, eight projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B2, B26, B29, B30, and B39, by searching for the current PA number and the previously issued PA numbers (PA-01-024, PAS-00-006, and PAS-99-010).
- Cancer Biomedical Informatics Grid (caBIG) (<http://cabig.nci.nih.gov/>)
 - ◆ Overview: Provides greater access to data, sharing of informatics tools and resources, and enables collaborations that span across laboratories and institutions. This grid is planned to be capable of expanding beyond the current proposed uses of clinical trials management, basic and clinical research support and data sharing, and tissue bank and pathology support.
 - ◆ Research Categories: All.
 - ◆ Relevant Resources Resulting From This Initiative: caBIG supports a variety of research applications, including the cancer Image Database (caIMAGE), cancer Model Organisms Database (caMOD), Cancer Central Clinical Database (C3D), and cancer Laboratory Information Management System (caLIMS). Original NCI databases such as the cancer Data Standards Repository (caDSR), Common Data Elements (CDE), CGAP, and CMAP are available to researchers through caBIG, as are tools and applications developed by partner institutions.
- Cancer Centers Program (www3.cancer.gov/cancercenters/)
 - ◆ Overview: Supports major academic and research institutions throughout the United States to sustain broad-based, coordinated, interdisciplinary programs in cancer research.
 - ◆ Research Categories: All.
 - ◆ Relevant Programs Resulting From This Initiative: More than 60 institutions have been awarded P30 Cancer Center Support Grants (CCSG) to fund the scientific infrastructure of their cancer centers. Support is provided for

elements such as scientific leadership and administration, research resources that give ready access to state-of-the-art technologies, and flexible funds that help the center pursue its planned objectives and take immediate advantage of new research opportunities.

- Cancer Genetics Services Directory (http://www.cancer.gov/search/genetics_services/)
 - ◆ Overview: Supports a directory of individuals who provide services related to cancer genetics, including cancer risk assessment, genetic counseling, and genetic susceptibility testing.
 - ◆ Research Categories: Etiology; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Resource Resulting From This Initiative: Individuals contemplating genetic testing can locate a genetics counselor by searching an online directory. More than 370 genetics professionals specializing in breast cancer are listed in the United States and Canada.
- Cancer Genome Anatomy Project (CGAP) (<http://cgap.nci.nih.gov/>)
 - ◆ Overview: Supports a collaborative program for determining the gene expression profiles of normal, precancerous, and cancerous cells.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis.
 - ◆ Relevant Resource Resulting From This Initiative: Through the CGAP Web site, researchers can access human and mouse genomic data, informatics tools, and information on methods and resources. The database has more than 20,000 expressed genes from normal or cancerous human mammary tissue. The SAGE Genie Anatomic Viewer tool allows scientists to identify genes uniquely expressed in specific cancers, including breast cancer.
- Cancer Imaging Program (CIP) (<http://www3.cancer.gov/dip>)
 - ◆ Overview: Encompasses multiple initiatives that support cancer-related basic, translational, and clinical research in imaging sciences and technology.
 - ◆ Research Categories: Biology; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Programs Resulting From This Initiative: Breast cancer research has been supported through Requests for Applications (RFAs) for the following programs:
 - Development and Application of Imaging in Therapeutic Studies
 - Development and Testing of Digital Mammography Displays and Workstations
 - Exploratory/Developmental Grants for Diagnostic Cancer Imaging
 - In Vivo* Cellular and Molecular Imaging Centers (ICMICs)
 - Planning Grants for *In Vivo* Cellular and Molecular Imaging Centers (Pre-ICMICs)
 - Small Animal Imaging Resource Programs (SAIRPs)
- Cancer Molecular Analysis Project (CMAP) (<http://cmap.nci.nih.gov>)
 - ◆ Overview: Provides access to information regarding various aspects of cancer molecular biology, including molecular signatures for specific cancer types, molecular targeted agents, and clinical trials evaluating these agents.
 - ◆ Research Categories: Biology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Resource Resulting From This Initiative: Data can be retrieved from the CMAP Web site for many types of cancer, including breast cancer.

- Cancer Prognosis and Prediction (PAR-01-061; PAR-01-062)
 - ◆ Overview: Supports the development of new strategies for determining prognosis or predicting response to cancer therapy.
 - ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Projects Resulting From These PAs: Between 1998 and 2003, five projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B29 and B33, by searching for these PA numbers.
- Cancer Research Network (CRN) (http://cancercontrol.cancer.gov/bb/can_research.html)
 - ◆ Overview: Supports research on cancer prevention, early detection, long-term care, and postdiagnosis monitoring.
 - ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Resource Resulting From This Initiative: Comprising 11 managed care research organizations, the CRN is developing integrated data systems to support studies that include evaluation of breast and cervical cancer screening and prophylactic mastectomy for women at high risk for breast cancer.
- Cancer Research Small Grant Program (PAR-02-176) and Cancer Prevention Research Small Grant Program (PAR-00-025)
 - ◆ Overview: Supports research in the fields of early detection, chemoprevention, biomarker development, and nutrition science. Short-term awards provide support for pilot projects, development and testing of new methodologies, or innovative projects that provide a basis for more extended research.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis.
 - ◆ Relevant Research Projects Resulting From These PAs: Between 1998 and 2003, 30 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B1-3, B6-17, B19, B21, B23, B30, B31, and B36, by searching for these PA numbers.
- Cancer Research Training, Career Development, and Education Opportunities (<http://cancertraining.nci.nih.gov/>)
 - ◆ Overview: Supports predoctoral and postdoctoral training and faculty career development in the field of cancer research.
 - ◆ Research Categories: All
 - ◆ Relevant Resource Resulting From This Initiative: More than ten types of awards exist to support training and career development in cancer biology, causation, prevention and control, detection and diagnosis, treatment, and rehabilitation research. The number of breast cancer-relevant individual training and career development awards nearly doubled between the years FY1998 and FY2003.
- Clinical Trials Cooperative Group Program (<http://ctep.cancer.gov/resources/coop2.html>)
 - ◆ Overview: Supports organizations that generate and conduct clinical trials consistent with national priorities for cancer research.
 - ◆ Research Categories: Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Resource Resulting From This Initiative: The cooperative groups include 14 member organizations, with 11 currently conducting trials on breast cancer. Banked tissue resources are available to investigators through each cooperative group.

- Community Clinical Oncology Program (CCOP) (<http://www3.cancer.gov/prevention/ccop>)
 - ◆ Overview: Supports a comprehensive clinical trials mechanism for disseminating the latest cancer prevention and treatment research findings at the community level.
 - ◆ Research Categories: Prevention; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Program Resulting From This Initiative: The CCOP includes 17 funded groups of hospitals or private practices that participate in NCI-funded clinical trials. Ten of these groups are currently participating in trials on breast cancer.
- Competing Supplements for Organotypic Models of Cancer (PAR-02-052)
 - ◆ Overview: Supports the development and use of novel organ-like model systems that more closely resemble normal tissue or emerging tumors than do simple tissue culture systems.
 - ◆ Research Categories: Biology; Etiology; Prevention.
 - ◆ Relevant Projects Resulting From This PA: Pending.
- Cooperative Human Tissue Network (CHTN) (<http://www-chn.ims.nci.nih.gov/>)
 - ◆ Overview: Supports the collection and distribution of benign, precancerous, and cancerous human tissue specimens for basic and developmental studies in cancer research.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Resource Resulting From This Initiative: Six member institutions currently coordinate the collection and distribution of specimens that include tissues obtained at surgery and autopsy, serum, and DNA/RNA. A Breast Tissue Progression Microarray is available in collaboration with CBCTR.
- Correlative Studies Using Specimens from Multi-Institutional Treatment Trials (PA-03-064)
 - ◆ Overview: Supports correlative studies using tumor specimens collected during multi-institutional trials. Potential studies may address the genetic variations and molecular changes within a cell, discovery of new cancer interventions, and promotion of translational research.
 - ◆ Research Categories: Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Projects Resulting From This PA: Between 1998 and 2003, seven projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B2, B29, B30, B34, and B36, by searching for the current PA number and the previously issued PA numbers (PA-98-099 and PA-01-015).
- Developmental/Pilot Projects in Cancer Complementary and Alternative Medicine (CAM) (PAR-02-040)
 - ◆ Overview: Encourages and supports the development of basic and clinical (prevention, therapeutic, and palliative) CAM cancer research. Another goal of this initiative is to facilitate communication and collaboration between the CAM practitioner and the conventional cancer research communities.
 - ◆ Research Categories: Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Projects Resulting From This PA: Between 1998 and 2003, six projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B33, B39, B41, B51, and B53, by searching for the PA number.
- Director's Challenge: Toward a Molecular Classification of Tumors (<http://dc.nci.nih.gov>)
 - ◆ Overview: Supports the scientific community in an effort to redefine tumor classifications using molecular rather than morphological criteria.

- ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis.
- ◆ Relevant Resource Resulting From This Initiative: The Director's Challenge program Web site provides researchers with information, analytical tools, and microarray data sets. The Molecular Portraits of Human Breast Tumors microarray data set is available. Between 1998 and 2003, two projects relevant to breast cancer research were supported through RFA-CA-98-027. Specific projects can be found in Appendix B, Tables B2, B29, and B30, by searching for the RFA number.
- Exploratory Grants for Correlative Laboratory Studies and Clinical Trials (PA-98-042)
 - ◆ Overview: Supports the development of innovative therapeutic clinical trials or new correlative laboratory studies using patient specimens from therapeutic clinical studies.
 - ◆ Research Categories: All.
 - ◆ Relevant Research Projects Resulting From This PA: Between 1998 and 2003, 12 projects relevant to breast cancer research were supported through the current PA and the previously issued PAs (PA-96-040 and PA-94-050).^c
- Flexible System to Advance Innovative Research for Cancer Drug Discovery by Small Businesses (FLAIR) (http://dtp.nci.nih.gov/branches/gcob/gcob_web17.html)
 - ◆ Overview: Provides a flexible system within the SBIR and STTR programs to support the extensive needs of the complex drug and vaccine discovery and development process, from basic discovery through proof-of-principle demonstration in clinical trials.
 - ◆ Research Categories: Biology; Treatment.
 - ◆ Relevant Research Projects Resulting From This Initiative: Between 1998 and 2003, 14 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Table B33, by searching for the PA/RFA numbers (PA-01-091, PAR-00-030, and RFA-CA-98-022).
- Improve DNA, RNA and Protein Availability in Fixed Tissue (PAR-00-079)
 - ◆ Overview: Supports the development of improved methods for fixing tissues and making nucleic acids and proteins more readily accessible from archived specimens.
 - ◆ Research Categories: Biology; Etiology; Early Detection, Diagnosis, and Prognosis.
 - ◆ Relevant Research Project Resulting From This PA: Between 1998 and 2003, two projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B2, B13, and B32, by searching for the PA number.
- *In Vivo* Cellular and Molecular Imaging Centers (ICMICs) (<http://www3.cancer.gov/bip/ICMICs.htm>)
 - ◆ Overview: Facilitate interaction among scientists from a variety of fields to conduct multidisciplinary research on cellular and molecular imaging related to cancer.
 - ◆ Research Categories: Biology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Resource Resulting From This Initiative: The NCI is currently supporting 7 ICMIC center grants and 12 pre-ICMIC planning grants that provide time and funds for investigators and institutions to prepare themselves, organizationally and scientifically, to establish an ICMIC.

c. Lists of projects derived from initiatives can be found on the online Supplement to the Breast Cancer Progress Report: Initiatives Database.

- Integrating Aging and Cancer Research (PA-02-169)
 - ◆ Overview: Supports projects that expand the knowledge base on aging and age-related aspects of cancer in older persons. This initiative originated from a workshop entitled Exploring the Role of Cancer Centers for Integrating Aging and Cancer Research, which was organized by the National Institute on Aging and the NCI to provide a forum for leaders in cancer and aging research to express their views on pressing research needs.
 - ◆ Research Categories: Biology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Resources Resulting From This PA: Reports from seven working groups address topics in Patterns of Care; Treatment Efficacy and Tolerance; Effects of Comorbidity on Cancer; Prevention, Risk Assessment, and Screening; Psychosocial Issues and Medical Effects; Palliative Care; End-of-Life Care and Pain Relief; and the Biology of Aging and Cancer.
- Interdisciplinary Research Teams for Molecular Target Assessment (RFA-CA-00-001)
 - ◆ Overview: Supports the development of methods to assess the effects of interventions directed at specific molecular targets that produce or are associated with the cancer phenotype.
 - ◆ Research Categories: Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Projects Resulting From This RFA: Between 1998 and 2003, two projects relevant to breast cancer research were supported through this RFA.^d
- Minority-Based Community Clinical Oncology Program (MBCCOP) (<http://www3.cancer.gov/prevention/ccop/mbccop.html>)
 - ◆ Overview: Supports a comprehensive clinical trials mechanism for disseminating the latest cancer prevention and treatment research findings to communities with large minority patient populations.
 - ◆ Research Categories: Prevention; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Program Resulting From This Initiative: The MBCCOP is composed of 13 funded groups of hospitals or private practices that participate in NCI-funded clinical trials.
- Minority Institution/Cancer Center Partnership (MI/CCP) (<http://minorityopportunities.nci.nih.gov/institutions/>)
 - ◆ Overview: Supports partnerships between Minority-Serving Institutions and NCI-designated Cancer Centers to increase training and involvement of scientists at minority institutions and to develop collaborative projects that address the disproportionate incidence and mortality rates of cancer in minority populations.
 - ◆ Research Categories: All.
 - ◆ Relevant Program Resulting From This Initiative: The MI/CCP emphasizes four target areas, including cancer research, research training and career development, cancer education, and cancer outreach. The MI/CCP offers three mechanisms of support for grantees:
 - Planning Grant for Minority-Institution/Cancer Center Collaborations (P20)
 - Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership (U56)
 - Comprehensive Minority Institution/Cancer Center Partnership (U54)

d. Lists of projects derived from initiatives can be found in the online Supplement to the Breast Cancer Progress Report: Initiatives Database.

- **Molecular Target Drug Discovery for Cancer (PAR-01-045; PAR-01-046)**
 - ◆ Overview: Supports the identification of novel molecular targets, the validation of the target as a basis for cancer drug discovery, or the development of assays for target function.
 - ◆ Research Categories: Biology; Etiology; Prevention; Treatment.
 - ◆ Relevant Research Projects Resulting From These PAs: Between 1998 and 2003, 18 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B2, B5, B7, B9, B15, B17, B21, B30, B33, B36, and B29, by searching for the current PA numbers and the previously issued PA/RFA numbers (PAR-00-060, PAR-00-061, PAR-00-062, and RFA-CA-00-002).
- **Mouse Models of Human Cancers Consortium (RFA-CA-04-002)**
 - ◆ Overview: Aims to derive, characterize, and validate mouse strains that model human cancers, including breast cancer, and to make these strains available to the research community. The Consortium infrastructure includes a Breast Cancer Models Working Group that fosters the development and use of mouse models serving as surrogate systems to study human breast cancer. Members of the Working Group are drawn from other NCI networks and consortia and the breast cancer research community, with participation by the Department of Defense and National Institute of Diabetes and Digestive and Kidney Diseases. The MMHCC convenes biannual meetings on progress in breast cancer modeling.
 - ◆ Research Categories: Biology; Etiology; Prevention.
 - ◆ Relevant Resources Resulting From This Initiative: Through the eMice Web site, researchers have access to mouse strains, reagents, analytical tools, protocols, gene data, drug databases, and other useful resources. There are 13 strains of mice that model breast cancer or breast cancer metastasis that can be ordered from the NCI Mouse Repository for use in research.
- **NCI Center for Bioinformatics (NCICB) (<http://ncicb.nci.nih.gov>)**
 - ◆ Overview: Provides bioinformatics support and integrates diverse research initiatives.
 - ◆ Research Categories: All.
 - ◆ Relevant Resources Resulting From This Initiative: NCICB's caCORE information management system software is available to researchers to facilitate their research needs. In 2003, NCICB introduced caBIG as an open-source public bioinformatics platform.
- **Nonmammalian Organisms as Models for Anticancer Drug Discovery (PAR-99-019; PAR-99-020)**
 - ◆ Overview: Supports projects that identify key genes, enzymatic activities, components of signaling pathways, or cellular processes that are altered in human cancer as potential intervention points that could be used in the design of new cancer drugs.
 - ◆ Research Categories: Biology; Treatment.
 - ◆ Relevant Research Projects Resulting From This PA: Between 1998 and 2003, two projects relevant to breast cancer research were supported.^e
- **Program for the Assessment of Clinical Cancer Tests (PACCT) (<http://www.cancerdiagnosis.nci.nih.gov/assessment>)**
 - ◆ Overview: Supports efforts to maximize the impact of cancer treatments and ensures the translation of new knowledge about cancer into clinical practice. A PACCT Strategy Group was convened to develop criteria for assessing which markers are ready for further development.

e. Lists of projects derived from initiatives can be found on the online Supplement to the Breast Cancer Progress Report: Initiatives Database.

- ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Treatment.
- ◆ Relevant Programs Resulting From This Initiative: Several Web sites that help researchers gain access to human specimens: NCI Specimen Resource Locator, Shared Pathology Informatics Network, Tissue Array Research Program, and Tissue Expediter.
- Shared Pathology Informatics Network (SPIN) (<http://spin.nci.nih.gov/>)
 - ◆ Overview: Supports efforts to develop and use state-of-the-art informatics techniques to establish an Internet-based virtual database that will allow investigators from multiple institutions to locate appropriate human tissue specimens for their research.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Program Resulting From This Initiative: Software supplied by the SPIN initiative can be run at participating institutions and will be able to respond to researcher-initiated queries with a listing of pathology specimens and related data that meet the query criteria.
- Shared Resources for Scientists Outside NCI Cancer Centers (PAR-99-127)
 - ◆ Overview: Provides additional shared resource support to institutions that do not have NCI-funded Cancer Centers or Cancer Center planning grants.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Programs Resulting From This PA: Between 1998 and 2003, seven projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Table B33, by searching for the current PA number and the previously issued PA/RFA numbers (PAR-98-092 and RFA-CA-01-020).
- Small Animal Imaging Resource Program (SAIRP) (<http://www3.cancer.gov/dip/sairp.htm>)
 - ◆ Overview: Supports shared imaging resources to be used by cancer investigators and research related to small animal imaging technology.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Programs Resulting From This Initiative: Ten participating institutions provide imaging resources for investigators in their region of the United States.
- Small Grants Program for Cancer Epidemiology (<http://epi.grants.cancer.gov/ResPort/grants.html>)
 - ◆ Overview: Supports the formation of relationships between large research institutions and community-based programs and addresses cancer burden in minority communities.
 - ◆ Research Categories: Biology; Etiology; Early Detection, Diagnosis, and Prognosis; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Programs Resulting From This Initiative: Between 1998 and 2003, 53 projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B1, B7, B8, B10, and B11, by searching for the PA numbers (PAR-03-010, PA-01-021, PAR-98-023 and PAR-95-077).
- Southern Community Cohort Study (SCCS) (<http://www.southerncommunitystudy.org>)
 - ◆ Overview: Supports a large population-based research study that is examining the reasons African Americans are more likely to be affected by many cancers, including breast cancer.
 - ◆ Research Categories: Etiology; Prevention; Cancer Control, Survivorship, and Outcomes.

- ◆ Relevant Details of This Study: The SCCS will recruit about 70,000 African-American and 35,000 non-African-American residents of the southern United States who will complete an interview and provide a DNA sample. Health outcomes in this group will be monitored for decades with the goal of identifying genetic factors that predispose certain groups to cancer.
- Special Populations Networks (SPNs) (<http://crchd.nci.nih.gov/spn/index.html>)
 - ◆ Overview: Supports collaborations between large research institutions and community-based programs to find ways of addressing important questions about the burden of cancer in minority communities.
 - ◆ Research Categories: Prevention; Treatment; Cancer Control, Survivorship, and Outcomes.
 - ◆ Relevant Programs Resulting From This Initiative: The current SPNs are composed of the following 18 projects in 15 states across the United States:
 - American Indian Initiative in Arizona
 - Appalachia Cancer Network (ACN)
 - Arkansas Special Populations Access Network (ASPAN)
 - Asian American Network for Cancer Awareness, Research, and Training (AANCART)
 - Asian Tobacco Education and Cancer Awareness Research Initiative (ATECAR)
 - Cancer Awareness Network for Immigrant Minority Populations (CANIMP)
 - Deep South Network for Cancer Control
 - East Harlem Partnership for Cancer Awareness
 - Imi Halé*, the Native Hawaiian Cancer Research and Training Network
 - Increasing Access to Clinical and Educational Studies (ACES)
 - Latin American Cancer Research Coalition (LACRC)
 - Latino/a Research and Policy Center
 - Maryland Special Populations Cancer Network
 - National Black Leadership-Cancer Control, Research and Training Network (NBL-CCRTN)
 - Pacific Islander Cancer Control Network (PICCN)
 - Redes En Acción*
 - Special Populations Network for Cancer Control (SPNCC)
 - The Network for Cancer Control Research among American Indian and Alaska Native (AI/AN) Populations.
- Specimen Resource Locator (<http://pluto3.nci.nih.gov/tissue/default.htm>)
 - ◆ Overview: Enables researchers to locate human specimens for cancer research.
 - ◆ Research Categories: Biology; Etiology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Program Resulting From This Initiative: The Specimen Resource Locator Web site provides investigators with information and automated tools for identifying tissue procurement systems, including those with samples from normal and diseased breasts.

- Technologies for Comprehensive, Sensitive, and Quantitative Protein Analysis in Human Tumors (RFA-CA-01-011)
 - ◆ Overview: Supports the development of innovative technologies for the sensitive quantitation of the comprehensive spectrum of proteins present in human tissues.
 - ◆ Research Categories: Biology; Early Detection, Diagnosis, and Prognosis.
 - ◆ Relevant Research Project Resulting From This RFA: Between 1998 and 2003, one project relevant to breast cancer research was supported through this RFA:
Technology for Global and Quantitative Proteome Analysis
- Therapeutic Modulation of Angiogenesis in Disease (PAR-98-096)
 - ◆ Overview: Encourages the translation of basic knowledge of the angiogenic process into therapeutic applications.
 - ◆ Research Categories: Biology; Prevention; Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Projects Resulting From This PA: Between 1998 and 2003, six projects relevant to breast cancer research were supported. Specific projects can be found in Appendix B, Tables B3, B15, and B16, by searching for the PA number.
- Unconventional Innovations Program (UIP) (<http://otir.cancer.gov/tech/uip.html>)
 - ◆ Overview: Supports the development of radically new technologies in cancer care that can transform what is now impossible into the realm of the possible for detecting, diagnosing, and intervening in cancer at its earliest stages of development.
 - ◆ Research Categories: Early Detection, Diagnosis, and Prognosis; Treatment.
 - ◆ Relevant Research Projects Resulting From This Initiative: A list of UIP-funded projects is available online and includes four projects with breast cancer relevance:
Molecular Imaging and Therapy of Solid Tumors With a Novel $\alpha v\beta 3$ -specific Nuclear Nanoparticle Targeted to the Neovasculature
Novel Technologies for Noninvasive Detection, Diagnosis, and Treatment of Cancer (a)
Novel Technologies for Noninvasive Detection, Diagnosis, and Treatment of Cancer (b)
Tissue Perfusion Imaging for Cancer Detection

Specialized Programs of Research Excellence (SPOREs)

In 1992, the NCI established the Specialized Programs of Research Excellence (SPOREs) to promote interdisciplinary research and to speed the bidirectional exchange of information between basic and clinical scientists. The SPORE program facilitates the translation of novel research ideas to the clinical care setting, with the goals of reducing cancer incidence and mortality, improving survival, and improving quality of life. Laboratory and clinical scientists work collaboratively to plan, design, and implement research programs that impact cancer prevention, detection, diagnosis, treatment, and control. In 2002 and 2003, 32 clinical trials in breast cancer research were supported through the Breast Cancer SPOREs. Table 2-2 provides more information on the research projects, core resources, and training and other opportunities that are provided by the current Breast Cancer SPOREs.

Table 2-2. Breast SPOREs

Baylor College of Medicine

Projects:

- Genetic Expression Profile of Taxotere Versus AC Sensitivity
- Growth Factor and Stress Response Pathway in Endocrine Therapy Resistance
- Molecular Classification and Prognostic Profiling of Ductal Carcinoma *In Situ*
- Prevention of Breast Cancer Using Signal Transduction Inhibitors
- Role of High-Frequency Hypersensitive Estrogen Receptor-Alpha Mutation in Breast Cancer Metastasis

Cores: Administrative Core, Biostatistics and Data Management, Pathology Core, and Tissue Core

Additional: Developmental Research Program and Career Development Program

Dana-Farber Cancer Institute

Projects:

- Creation of Animal Models for Human Breast Cancer
- Functional Testing for BRCA1 and BRCA2
- Identification of Targets for Intervention in Breast Cancer
- Molecular Markers in DCIS
- Plasma Estrogens in Breast Cancer Risk and Prevention
- Role of G2 Checkpoint Genes in Breast Cancer Susceptibility

Cores: Biostatistics Core, Clinical Data and Data Management Core, High-Risk Patients and Their Families, and Tissue and Pathology Core

Additional: Developmental Research Program and Career Development Program

Duke University Medical Center

Projects:

- Application of Pharmacogenomics to Treatment of Breast Cancer
- Genetic Modifiers of BRCA1 and BRCA2
- Hypoxia and Chemoresistance in Breast Cancer
- T-Helper Responses to Her2/*neu* in Breast Cancer Patients

Cores: Administration, Tissue Bank, Biostatistics and Informatics, and Molecular and Cell Technology

Additional: Developmental Research Program and Career Development Program

Georgetown University Medical Center

Projects:

- A Phase III Multicenter Randomized Trial Comparing Cyclophosphamide, Thiotepa, and Carboplatin (STAMP V) With or Without IL-2-Activated Stem Cell Transplantation and Parenteral IL-2 for High-Risk Breast Cancer Patients
- Antimetalloprotease Therapy
- Development of Her-2/*neu*-Targeted Small Molecule Inhibitors as Novel Cancer Therapeutics
- Inhibition of Breast Cancer Xenograft Tumor Growth by a Naturally Existing Secreted Form of VEGI (Vascular Endothelial Growth Inhibitor)
- Mammary Carcinogenesis, the Role of Pleiotrophin
- Resistance to Hormone and Chemotherapy in Breast Cancer
- Systemic *p53* Gene Therapy Markedly Enhances the Efficacy of Conventional Cancer Therapies

Cores: Breast Cancer Cell Line Resource, Breast Cancer Tumor Bank, SPORE Clinical Research Core, The Breast Cancer Serum Biomarker Resource, and Transgenic Shared Resource Core

Additional: Developmental Research Program and Career Development Program

Northwestern University Medical School

Projects:

- Actions of Estrogen Agonists and Antagonists by Nonclassical Transcription Pathways
- An Angiostatic Cocktail for Women With Refractory Breast Cancer: A Translational Study
- Antiestrogens and Breast Density in Premenopausal Women
- Drug Resistance to Antiestrogens

Cores: Administrative Core, Biostatistical Core, Clinical Core, and Tissue Resource Core

Additional: Developmental Research Program and Career Development Program

The Johns Hopkins University School of Medicine

Projects:

- Molecular Detection of Breast Cancer
- Molecular Epidemiology of Progression to Breast Cancer
- Molecular Markers for Breast Cancer
- Molecular Phenotypes of Breast Cancer
- Novel Polyamine Analogues for Breast Cancer Treatment
- Use of Modulators of DNA Methylation and Histone Deacetylation to Treat Breast Cancer
- Vaccines: A New Paradigm for Breast Cancer

Cores: Administration and Communication Core, Biostatistics and Bioinformatics Core, and Human Specimen Resource and Database

Additional: Developmental Research Program and Career Development Program

University of Alabama at Birmingham

Projects:

- Biology and Intermediate Marker Role of a Novel Breast Cancer Oncogene, GKLf
- Gene Therapy Specifically Directed at Tumor Vasculature
- Molecular Regulation of Breast Cancer Metastasis
- Polynucleotide Vaccine Therapy of Breast Cancer
- Preclinical/Clinical Development of Novel Retinoids
- Pretargeting Radioimmunotherapy of Metastatic Breast Cancer

Cores: Administrative Core, Biostatistical Core, Tissue Procurement Core, Immunopathology Core, and Clinical Trials Core

Additional: Developmental Research Program and Career Development Program

University of California, San Francisco

Projects:

- A New Model System to Identify Markers for Risk and Targets for Chemoprevention
- Breast Cancer Therapeutic Agents That Force Telomerase Misfunction
- Identification and Targeting of Novel Breast Cancer Antigens for Antibody-Based Breast Cancer Therapy
- Molecular Determinants of Response to RTK Pathway Inhibitors
- Predictors of Recurrence in Women with DCIS
- Targeted Drug Delivery via Immunoliposome Technology

Cores: Administrative Core, Advocacy Core, Preclinical Animal Core, and Tissue-Outcomes Core

Additional: Developmental Research Program and Career Development Program

University of North Carolina at Chapel Hill

Projects:

- A Novel Chemotherapy Combination for Breast Cancer
- Breast Tumor Molecular “Profiling” Using cDNA Microarrays
- Carolina Breast Cancer Study: DNA Repair Genes and Breast Cancer Risk
- Carolina Breast Cancer Study: ER Alterations in Breast Cancer Development
- Correlation of Molecular Markers With Response to Neoadjuvant Chemotherapy
- Enhancing a Breast Cancer Vaccine
- Inhibition of Chemotherapy-Induced NF B

Cores: Administrative Core, Biostatistics and Bioinformatics Core, Genomics and Microarray Core, Molecular Analysis and High-Throughput Genotyping Core, and Tissue Procurement and Analysis Core

Additional: Developmental Research Program and Career Development Program

Vanderbilt University

Projects:

- HER (erbB) Tyrosine Kinase Inhibitors in Treatment-Naïve, Operable Breast Cancer
- Molecular Epidemiology of Proliferative Breast Disease
- Molecular Imaging of Breast Carcinoma and Therapeutic Response
- Predictive Markers of Clinical Response to Paclitaxel Therapy in Stage II/III Breast Cancer

Cores: Administrative Core, Antibody Production and Characterization Core, Biomedical Informatics Core, Biostatistics Core, Proteomics and Emerging Technologies Core, and Tissue Core

Additional: Developmental Research Program and Career Development Program

Ongoing NCI Research: SPOREs**Developmental Projects in Early Detection and Drug Targeting**

The SPORE Working Group on Biomarker Development recognizes the importance of pursuing research on novel biomarkers for potential clinical applications. This group recently identified the *KLF4 Biomarker Project*, currently under way at the University of Alabama (UAB), as an important area for future development. Researchers involved with this project are testing the hypothesis that nuclear localization of the Krüppel-like transcription factor (KLF4) protein identifies an aggressive subset of early-stage breast cancers. Previous studies have demonstrated that KLF4 is upregulated in breast cancer and squamous cell carcinomas of the oral cavity and skin (Foster et al., 2000). In their first study of 146 patients, researchers demonstrated that the KLF4 marker is an independent prognostic factor that is more strongly associated with an outcome than any other biomarker assessed in parallel (p53, ER/PR, p27Kip1, EGFR, Ki67, Bcl-2, and Her2/*neu*) (Pandya et al., 2004). Results from this initial study suggest that KLF4 could be used to identify approximately one-half of early-stage breast cancer patients who will eventually die of the disease.

The SPORE Molecular Targets Working Group identified the *Immunoliposome Project* at the University of California, San Francisco (UCSF) Breast Cancer SPORE site as an important project. Scientists at this site are working on advanced drug delivery technologies that enable highly robust and versatile encapsulation of various cytotoxic compounds into stabilized liposomes. Novel liposome constructs containing existing chemotherapeutic drugs vinorelbine, vincristine, epirubicin, and camptothecins result in extremely stable and long-circulating nanoparticles. The antitumor activity of liposome-encapsulated drugs can be enhanced by the addition of an immunoconjugate, which allows for antigen-specific targeting of the liposome. The UCSF Breast Cancer SPORE project has developed immunoliposomes (ILs) directed against HER2 and has demonstrated their effectiveness in delivering doxorubicin for enhanced *in vivo* antitumor activity (Park et al, 2002). HER2-targeted ILs containing doxorubicin have been optimized for clinical development and are currently being manufactured by industry partners for use in clinical studies.

Collaborations and Partnerships

Breast Cancer SPOREs meet annually at a SPORE Investigators Workshop to share data, assess research progress, and identify new research opportunities. In many cases, funded SPORE institutions forge collaborations with each other and with clinical trials groups to increase the likelihood of success for their projects. For example, the University of California, San Francisco Bay Area Cancer Translational Research Program, the University of North Carolina at Chapel Hill Breast Cancer SPORE, and the Georgetown University SPORE share funding to study the use of magnetic resonance imaging (MRI) as a quantitative tool to measure response to chemotherapy in Stage III breast cancer patients and to correlate these findings with biomarker analyses performed on tumor biopsies. The study entitled *Stage III MRI and Correlative Science Companion Study* is led by UCSF and includes collaborations at SPORE institutions, centers that do not have Breast Cancer SPORE funding (the Memorial

Sloan-Kettering Cancer Center, the University of Texas Southwestern Medical Center, and the University of Pennsylvania Cancer Center), and other NCI-sponsored groups (the Cancer and Leukemia Group B [CALGB] and the American College of Radiology Imaging Network [ACRIN]). The SPORE program supports the correlative science component of the project while the MRI analyses and clinical trials are supported by ACRIN and CALGB, respectively. The inclusion of this many collaborating institutions ensures the accrual of sufficient numbers of patients for solid statistical analysis of the study's endpoints, which include the identification of new, early predictors of response and the establishment of a direct relationship between imaging/marker findings and survival.

In another example of a unique collaboration, the Avon Foundation (AVON) and NCI developed the *AVON-NCI Progress for Patients (PFP) Awards Program*, a special private-public partnership to fund innovative research for preventing, detecting, diagnosing, and treating breast cancer. AVON pledged \$20 million to fund breast cancer research over 5 years through a limited competition involving institutions with NCI-funded SPORE grants and Cancer Center grants. The program goal is to increase the number of new early-phase clinical breast cancer interventions and help move promising drugs, biomarkers, and procedures into Phase III clinical trials. By the end of 2003, eight SPORE projects in breast cancer had received supplemental funding through the PFP Awards mechanism. The following ongoing research projects address issues relevant to breast cancer prevention, treatment, and early detection/diagnosis/prognosis:

- Antiangiogenic Therapies for Breast Cancer
- Biological Markers in Breast Cancer Treated by Neoadjuvant Chemotherapy
- Markers of Short-Term Breast Cancer Risk in Fine-Needle Aspiration
- New Biomarkers for Aromatase Inhibitor Therapy
- Novel Approaches for Patients With Large Breast Cancers
- Response to Preoperative Therapy in Breast Cancer
- Surrogate Endpoints in Prevention Studies and Ductal Lavage
- Validation of Breast Biomarker Panel

These types of collaborations and partnerships increase the likelihood of success for SPORE researchers in their efforts to translate basic laboratory findings into practical clinical applications for treating breast cancer.

NCI-Supported Research Referenced in Chapter 2

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